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GRINDSTONES.

What should we do without grindstones in the manufacturing arts? The dependence on them is so great that if the supply were stopped a cry would go up from the workshops far and near. From the cutlers' shops, from the grinders of axes, and the armories; from those who make scissors, and from the glass cutters' shops, where the crystal goblets gleam like jewels; from the mechanic who has only a chisel to sharpen, and the housewife whose knife is dull; from the farmer who is waiting in the field where the harvest is white for the sickle. These all would cry out if they were suddenly deprived of grindstones.

In view of their utility, their history from the rise and progress of the stone—from the deposit in the quarry to the finished state—will be interesting; and such an account is here presented.

Grindstones are procured in many places; they are imported from France, England, and Nova Scotia; they are also made on the shores of Lake Huron. But the largest and by far the most extensive quarries are in the State of Ohio.

The principal illustration at the head of this article gives a view of the works of F. M. Stearns & Co., Berea, Cuyahoga County, Ohio, twelve miles from Cleveland, on the Cleveland, Columbus and Cincinnati Railroad. It will give the reader a good idea of the extent of the business. Like stacks of cheeses the stones are piled tier on tier; and in the distance may be seen workmen getting out others. The subordinate illustratoins show clearly how the several operations are carried on. As, for instance, in Figure 2, the workmen are in the act of quarrying. The huge slabs or layers may be cut of any length, either 20 or 200 feet long, and 6 inches or 6 feet thick, to suit circumstances. The method of quarrying such a block is as follows:—

GRINDSTONE WORKS AT BEREA, OHIO.

QUARRYING THE STONE.

MAKING THE EYE.

The surface dirt having been removed, trenches or channels are cut at each end of the piece to be quarried; after this, small holes 12 inches apart in a parallel line, 12 feet from the face, are made. In these holes iron wedges, one and a half inches square by six inches long, are placed and struck heavily with a sledge. The layers, in the natural state, are piled one upon the other, extending back we know not how far, and are seldom found joined together. The piece is then separated into small blocks of 50 or 5,000 pounds weight, according to the size of the stone required.

Another workman is shown in Fig. 2 in the act of splitting these blocks with wedges, at the same time gazing at the reader—being attracted, probably, by the proceedings of the photographer at the moment these views were taken. Having shaped the stone partially it is then necessary to chip off the square corners so that it becomes octagonal; this having been done a workman proceeds to put an eye in by picking it out. This may seem paradoxical, but is strictly the case, as will be seen by referring to Fig. 3. Here another workman, also looking at the reader instead of his work, has the stone before him on a block, and with a sharp steel pick is making a square hole in the center. It is then taken away to be turned off true. This is done on a rude sort of lathe, but quite sufficient for the purpose. It consists of a revolving mandrel, square at the part to receive the stone, which is then tightly keyed to the mandrel through a hole in the end. Two men then apply rods of Swedish iron to the revolving stone. These rods are five feet long, one and a half inches wide, and five-eighths of an inch thick, tapered to a point by the blacksmith and afterward hammered to a hooked point by the workmen. The

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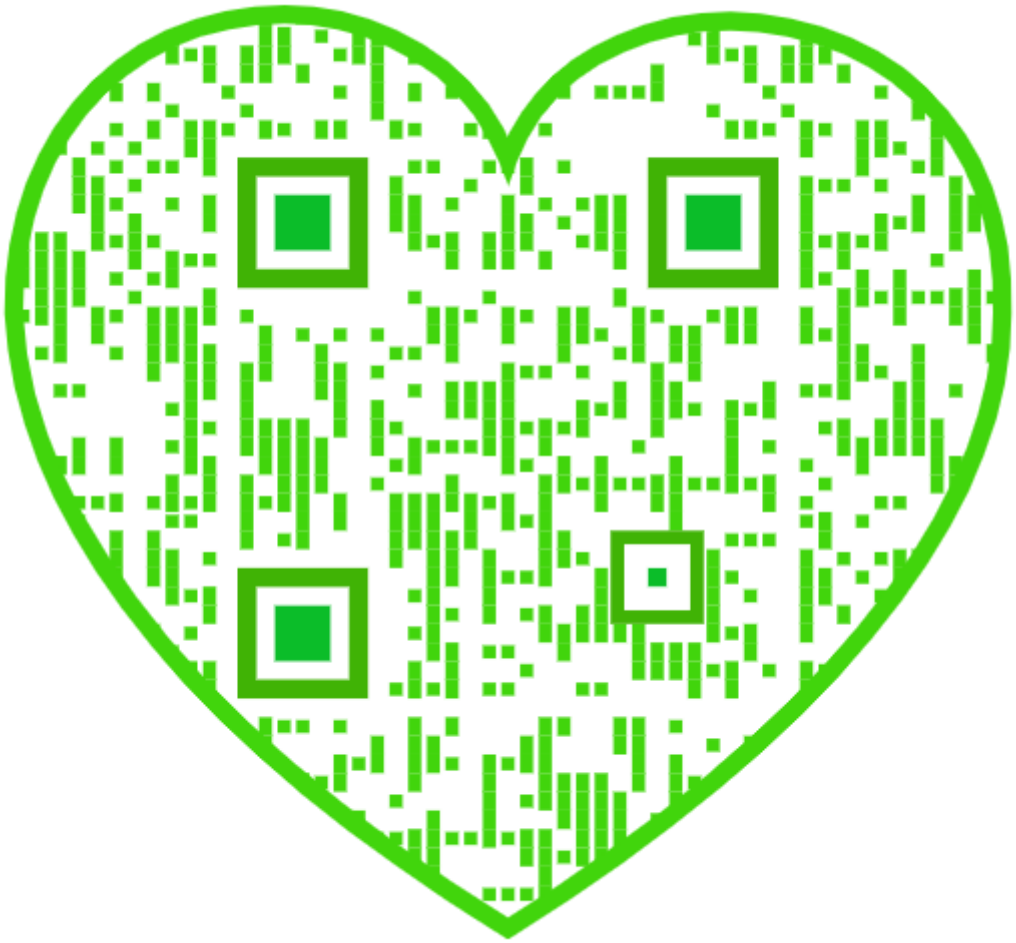
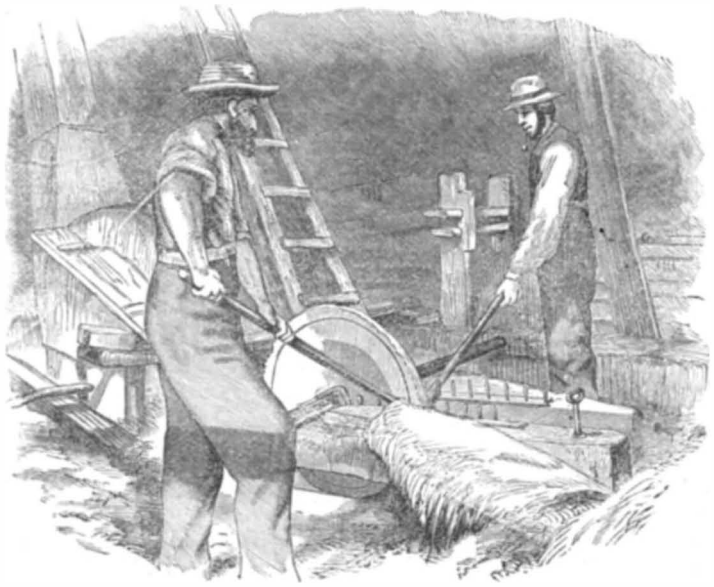


stone runs about 125 revolutions per minute. The men are able to turn about 100 to 200 in ten hours—varying in size from 50 to 200 pounds in weight. Large and small sizes are turned in the same way.

Back of the stone is an exhaust fan, which sucks off all the dust as fast as it is made, so that the room is free from fine particles which are very injurious to the lungs. This dust is carried to the top of the building, and from thence scattered to the four winds of heaven to fall on the just and unjust.

And this is the way grindstones are made.

Besides grindstones, Messrs. Stearns & Co. prepare other articles, such as block stone for ornamental buildings, flagging, well covers, saw grinders for gumming saws, ash houses, cisterns, currier blocks for tanners' use, also ax bitts, scythe-stones, shoemakers' and kitchen sandstones. The latter are made by breaking the stone into the proper size, and are subsequently ground to the required form.



TURNING THE STONES.

PACKING THE STONES.

The machine for grinding these stones into the desired shape, consists of an upright shaft on which a wooden head is fastened and filled with scraps of nail plate. Sand and water are used in the same manner as on cast-iron plates in marble manufactories. The advantage that such a rubber has over a cast-iron plate is, that it will cut more than three times as fast. For where the nails are driven in the wood being softer, wears away more rapidly and leaves a constant cutting edge, which may be felt by pressing the finger upon the rubber. The stone to be ground is held in the hands of the workman, and by skillful practice he is able to give it the desired form.

Those grindstones that are to be shipped to a great distance must be securely packed. This is accomplished by a peculiar invention, patented by F. M. Stearns, June 20, 1865, and shown in Fig. 5. A number of stones are placed in a row, and at each end is a wooden head, about the size of the stone, through which a wooden shaft and an iron rod is pushed through the eyes of the stones, and the whole are bound firmly together with a nut and screw. Slats are then fastened across the stone from one head to the other, and hooped to prevent them from being knocked off; so that if their destination be California, or some foreign country, they will arrive in good condition.

Small stones for mechanics, farmers, and general purposes, are made and mounted. The eye is made to fit any desired size of shaft, and an adjustable rest for grinding mowing machine knives, or any other tools that require special angles, is attached. This fixture was patented by F. M. Stearns, Dec. 27, 1864.

Besides these, a stone of 18 inches in diameter, in wooden troughs, for ship and store use, and stones from 6 to 12 inches for kitchen use, are made. These are fitted with iron troughs from castings made at their works.

The shoe stone are sold in cases of 75 pounds, scythe stones in quarter-gross boxes; and ax bitts, oil stones, and kitchen sand stones, in 10-pound boxes.

Grindstones are universally abused by persons who should know better. They are not only exposed to all kinds of weather, but they are also left in water, and otherwise damaged. Such abuses should not be practiced. When not wanted they should be kept out of water and under cover.

The capacity of the works is about twenty tuns of grindstones and from ten to fifteen car loads of flagging, building, and other miscellaneous stone—when in full operation—per day. They are shipped by rail direct from the quarry of F. M. Stearns & Co., Berea, Ohio, without change of cars, to Cincinnati, St. Louis, Chicago, Pittsburg, Buffalo, New York, Boston, and all intermediate places; and, by lake, to Canada, and foreign countries via the Welland canal.

SUSPENSION BRIDGES OF THE WORLD.

The Menai Bridge, constructed by Thomas Telford, Esq., was at the time of its erection regarded as one of the wonders of the world. Its complete success gave a great impulse to the erection of bridges on the same principle, and though its dimensions have since been far surpassed, if it be considered with reference to the then state of bridge engineering, the genius of its designer will still command deserved admiration.

The Fribourg Suspension Bridge is a wire bridge, and crosses the Sarine at a hight of 167 feet. The span from pier to pier is 870 feet, and the deflection of the cables 55 feet. These cables are four in in number, and are suspended in pairs at each side, the cables of each pair being close together, in order to support double hooks which rest upon and embrace both cables. To the center stems of these hooks are attached the suspenders, which thus hang down between the two cables of each pair.

The cables are formed of iron wire about one-twelfth of an inch in diameter. Each cable consists of 15 strands containing 80 wires each, which are not twisted as in a rope, but go straight from end to end, being retained in a cylindrical form by soft wire, which is wound round them at intervals of two or three feet.

La Roche Bernard, a town in the north west of France, possessed a few years since a fine wire suspension bridge. An elaborate description of it was published in 1841 by M. Leblanc, from which it appears that the span was 650 feet, and the deflection of the cables 50 feet, and that it crossed the Vilaine 108 feet above high water. Further description is needless, the bridge having since fallen. This catastrophe appears to have occurred from the usual causes --too great lightness and flexibility.

The St. John's Bridge, New Brunswick, was also originally constructed by Colonel Serrel, but having since fallen, has been replaced by a stronger structure erected under the superintendence of Mr Roebling. The span was 630 feet, and is about the same now.

The St. John's Bridge is remarkable, and is more especially mentioned here, for the picturesque beauty of its situation, in which respect it has been compared with the Clifton Bridge in England. It is however inferior to it, not only in hight above the water, but in general effect.

The Wheeling Suspension Bridge, across the Ohio, was erected in 1848 by the Hon. Charles Ellet. The span from center to center was 1,010 feet, and the actual platform 960 feet. The roadway was 26 feet wide, and was suspended from twelve wire cables about one-tenth of an inch in diameter.

This bridge "obtained considerable noteriety from the litigation it caused; strenuous and long-continued efforts having been made during its continuance to obtain its removal on account of the alleged injury to navigation." All disputes were, however, set at rest on May 17, 1854, when the structure was completely destroyed by a high wind.

The fall of this bridge is the greatest disaster of the kind on record, and had great influence in bringing wire bridges into disrepute. That it cannot, however, be attributed merely to the use of wire as a material, is proved by experience in other cases; and the real cause appears to have been the too great lightness of the structure altogether. The Wheeling Bridge only weighed 450 tuns in all; it had very little trussing, and no stays either under or over the floor. Eye-witnesses of the catastrophe describe the vertical oscillation of the platform just before the final crash as absolutely terrific: one spectator estimated it at twenty feet, an amount almost incredible, and which should, by proper precautions, have been rendered impossible. Without provision to secure stiffness as well as strength, no suspension bridge built with any material can be considered safe.

The Queenston Bridge was erected in 1852 by Lieut-colonel E. W. Serrel. It crossed the Niagara about six miles below the railway bridge, connecting Queenston and Lewiston. The span from center to center was 1,040 feet and the width of the platform 22 feet. The cost was under $50,000, or about £10,000.

While this bridge remained it was much admired for its immense span—"the longest in the world." After suffering severe damage on a previous occasion, however, it finally fell during a severe storm in Jan., 1862, and has not been rebuilt, the traffic being insufficient to defray the expense.

This disaster also is plainly attributable to the great lightness and want of stability of the bridge, which rendered it unable to withstand the heavy gales which blow up the river from the lower lake. The platform was only suspended from two wire cables about four inches diameter—quite insufficient for such an exposed situation. The immense span of course increased the danger, which ought to have been provided for by increased precautions to secure strength and rigidity.

The Niagara Railway Bridge, was erected under the superintendence of Mr. John A. Roebling. It was commenced in September, 1852, and opened for railway traffic on March 18, 1855. The lower floor, for common travel, was in use the previous year.

The span of the bridge is 821 feet 4 inches from center to center, and the length of suspended platform exactly 800 feet.

The bridge consists of two floors, one 19 feet above the other, leaving 15 feet clear between them. The lower floor is appropriated to ordinary traffic, while the upper is used for railway business, and "sidewalks." The top floor measures 25 feet 4 inches across outside the railings; the bottom floor is a foot narrower. The railway track is 245 feet above the river.

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Each floor is attached, by separate suspenders, to a separate pair ot cables; though, of course, by means of trusses and other connections, any load is mutually borne by all the cables. The cables are, therefore four in number; each cable is 10¼ inches in diameter, and composed of 3,640 wires about one-tenth of an inch in diameter. These wires are made up into seven strands of 520 wires each, which are bound round at intervals to keep them in their places. The strength of all the cables is calculated at 12,000 tuns, each wire being able to bear 1,648 lbs. without breaking. The tota length of the top cables is 1,261 feet and of the bottom cables 1,194 feet. The cables supporting the lower floor descend 10 feet lower than the top pair, the deflection from a straight line being 54 and 64 feet respectively.

The suspenders are 624 in number, placed 5 feet apart.

The structure is remarkably steady and free from vibration; to secure which desirable object various means have been employed.

The principal cause of the stiffness of the bridge is the system of trussing adopted. On each side of the bridge the upper and lower floors are connected by wooden posts, arranged in pairs side by side, just sufficiently apart to allow the diagonal truss rods crosing between them. These truss rods are of wrought iron an inch in diameter, and extend at an angle of 45 deg. from the bottom of one pair of posts to the top of the fourth pair from it. As the posts are 5 feet apart, like the suspenders, the pressure above any pair of posts is by these truss rods spread over a space of forty feet. The truss rods are screwed at the ends; and thus, if the timber should shrink at any time, all can be made right again by simply tightening the nuts on the truss rods, which braces all tight up together again. In short the two floors, connected by the system of posts and trusses here described, give much of the rigidity of a tubular bridge, with only perhaps a tenth of its weight.

There are also a number of diagonal wire stays, extending from the top of each tower. These stays are 64 in number, and though they do not bear much of the weight of the bridge, Mr. Roebling believes them to gnard it considerably against vertical oscillation. A number of smaller stays are also attached to the underside of the structure, and anchored to the rocks below.

The inclination of the upper cables also greatly guards the bridge against horizontal vibration. The centers of the towers are 39 feet apart; but instead of hanging straight from tower to tower, the top cables are brought in the middle to within 13 feet of each other. The suspenders are also inclined inward; and the whole arrangement, though it puts a very slight additional strain upon the cables, tends greatly to maintain the steadiness of the structure.

The construction of the masonry is one cause of the economy of the bridge. Instead of a massive tower on each pier, as in most European examples, there are two towers one for each pair of cables, so slender that they look like mere chimneys, yet abundantly sufficient for the purpose. The basement is a mass of masonry 60 feet by 20 feet, pierced by an arch 19 feet wide, which forms the entrance to the lower floor at each end. Above this are built two towers, each 60 feet above the arch, 15 feet square at the base, and 8 feet square at the top. By this light construction' without incurring any risk, much masonry and money is saved.—*Lewis Wright.*

The Cattle Plague.

Our last accounts of the cattle plague in England show that up to the 3d of March, during the six months in which the epidemic has so far prevailed, 187,059 cattle have been infected, of which 117,654 have died directly from the disease, and 26,135 have been killed by way of preventing its spread. But this statement is only the Inspector's report, and does not pretend to give the whole number of cattle which have perished since the beginning of the pest in the latter days of August.

It appears that the general epidemic had increased steadily up to the latest mail from England, every step of its march becoming more alarming. The number of deaths, which averaged a thousand or more per week in September, increased from 1,700 to 2,000 in October. Up to November, 17,673 animals had been attacked, of which only 848 could recover or would be allowed to recover. By the middle of November, 20,000 (or as was stated), one in a thousand had perished; and up to December, 40,000 had caught the disease. By the 1st of January the number reached 73,549; 7,683 dying in one week; and in the last week of January, 9,243. By the middle of January, 107,098 had been attacked, only 15,527 remaining under treatment. The February papers picture the plague as positively awful in the country, and by the middle of the month, 150,000 cattle had become infected, and all but 40,000 had died.—*Tribune.*

[The number of deaths in a week, 9,243, is eqnal to 1,320 a day, 55 an hour, and very nearly one a minute. As the cattle of England are generally of fine quality and great value, this is a rapid destruction of property.

MARKETS FOR THE MONTH.

The prominent event in business matters during the month of March is the fluctuation in the price of gold, which fell from 140½ to 124⅞, and afteward rose to 128¼. Of course, it is not gold that fluctuates but our paper money; when gold is qnoted at 140, it is equivalent to saying that bank notes and Government legal tenders are worth 71 cents in the dollar; while gold at 128 means that the value of a paper dollar is 78 cents. These fluctuations in the legal measure of values create disturbances in business matters.

	Price Feb. 27.	Price Mar. 28.
Coal (Anth.) ₩ 2,000 lb.	$11 50 @12 00	$9 00 @10 00
Coffee (Java) ₩ lb.	27½@ 28½	27 @ 28
Copper (Am. Ingot) ₩ lb.	35½@ 36½	30 @ 31
Cotton (middling) ₩ lb.	44½@ 46	40 @ 42
Flour (State) ₩ bbl.	$6 60 @ 8 40	6 60 @ 8 25
Wheat ₩ bush.	2 20 @ 2 80	1 75 @ 2 90
Hay ₩ 100 lb.	80 @ 85	65 @ 70
Hemp (Am.drs'd) ₩ tun.	325 00@335 00	325 00@335 00
Hides (city slaughter) ₩ lb.	12½@ 13	10½@ 11
India-rubber ₩ lb.	75 @ 1 00	60 @ 85
Iron (American pig)	48 00 @50 00	43 00 @45 00
Iron (English and American refined bar)	100 00@110 00	117 50@122 50
Lead (Am.) ₩ 100 lb.	9 00 @ 9 12½	8 32 @ 8 55
Nails ₩ 100 lb.	7 50	7 @ 7 25
Petroleum (crude) ₩ gal.	27½@ 28½	25
Beef (mess) ₩ bbl.	16 00 @24 00	15 00 @24 00
Saltpeter ₩ lb.	22	20
Spelter (plates)	9½@ 11½	9 @ 11½
Steel (Am. cast) ₩ lb.	13 @ 22	12 @ 21
Sugar (brown) ₩ lb	9 @ 16	9 @ 15
Wool (American Saxony fleece) ₩ lb.	72 @ 75	70 @ 80
Zinc ₩ lb.	14 @ 15	13 @ 13½
Gold	1 38	1 28½
Interest (loans on call)	7	5 @ 6

Nitrous-oxide as an Anæsthetic.

The use of nitrous-oxide gas in the experience o J. M. Carnochan, M. D., of New York, as mentioned in his interesting article in the *Reporter* of Jan. 6th would seem to be preferable to the use of ether or chloroform.

It is preferable on account of its producing sound anæsthetic sleep in three-fourths of a minute, its administration being attended with no danger, whilst nausea and vomiting are never produced.

We have found it easy to prepare nitrous-oxide gas (NO) by heating nitrate of ammonia (NH4 O NO5), but the use ot the present unwieldy bags, the heat, and nitrate of ammonia, will probably prevent the gas from coming into general use among practitioners.

If some apparatus can be devised, whereby nitrous-oxide gas can be administered as expeditiously and economically as chloroform on a hankerchief, then it is probable nitrous-oxide gas would come into general use as an anæsthetic. W. H. White, M. D.

Norfolk, Va., Jan. 1866.

[*Medical and Surgical Reporter.*

Statisties of Ohio.

The Toledo *Blade* publishes an abstract of the annual report of the State Commisioner of Statistics of Ohio, from which we extract the following summary:—

"The amount of land cultivated in 1864 was 700,000 acres less than in 1862. Machinery did the work of 50,000 persons while the men were at war. The average production in 1865 of crops was up to that of a series ot preceding years. The crop of oats was estimated at 18,000,000 of bushels; corn, 90,000,000 of bushels, and hay 2,000,000 of tuns. From nine counties in the State was grown an aggregate of 13,144,779 pounds of tobacco.

"The destruction of almost the entire fruit crop of 1865 was traceable to the ice storms of winter, and the extraordinary humidity of the atmosphere in April, May and June.

"There are 3,340 miles of railroad in the State, with a paid up capital of $77,694,737, and an indebtedness of $58,931,686.

"The production of maple sugar, sorghum sugar, maple molasses, and sorghum molasses was, in total, sugar, 5,239,729 lbs.,; molasses, 2,933,697 gallons.

NEW PUBLICATIONS.

General Notions of Chemisrry—By J. Pelouze and E. F. Fremy. Translated from the French by Edmund C. Evans, M. D., Philadelphia. Lippincott, Grambo & Co.

This is a small volume of 439 pages illustrated by 27 lithograph engravings, and from the high character of the authors, is, of course, trustworthy authority. It is intended for beginners, and the authors hoped to make it more easy and acceptable by omitting symbols, and, of course, any explanation of the atomic theory and equivalent proportions. We have no doubt that this is a mistake; the shortest, as well as the easiest and most agreeable road, to a knowledge of chemisrry, is the mastery of Dalton's atomic theory. This is the key that unlocks the mysteries of the science.

Experiment with Traction Engines.

Messrs. Aveling & Porter, a firm of steam engine builders in England, who are making a good many traction engines, recently tried an experiment to ascertain the cost of transporting goods by steam engines on common roads—that is English common roads, which are macadamize turnpikes. The editor of the London *Engineer* was invited to take notes of the trial, and he gives the results on his own authority. The work performed consisted in hauling three wagons, loaded with 15 tuns of lime, stone, and coal, 26 miles; the whole weight of the train being 21 tuns. The train started at 5:55 A. M., and arrived at 6:30 P. M., occupiog 12 hours and 30 minutes in the journey, including 33 minutes spent in trying to stop "a leak between cylinder cover and valve box cover." This is a speed of 2:8 miles per hour. The coal consumed was 23 cwt. and the expenses of the journey reduced to dollars and cents were as follows:—Tolls, $10 54; coal, 5 57; oil and waste, 84 cts. labor, $3 12; wear and tear and interest, $2 94; $23 01.

This is equal to $1 53 per tun for the 26 miles, and 6 cents per tun per mile; to which must be added the cost of loading and unloading. Our readers will not fail to observe that the tolls for this 26 miles of turnpike amounted to ten and a half dollars.

Hub, Spoke, and Felly Machinery.—We have constant inquiries for this class of machinery, from readers in all parts of the country. As we always refer such inquirers to those who advertise in our columns, we think that manufacturers will do well to advertise constantly in the Scientific American. The profits from a single advertisement will sometimes pay the expense of advertising for an entire year.

Portraits on Watches.—A novel idea was recently carried out by an individual in Philadelphia. Desiring to have a picture of his father constantly before him, he took his watch to a jeweler had the dial removed, and the likeness photographed upon it. Porcelain pictures have been taken for some time, but this is a new phase of them.

Trussed Connecting rods for Locomotives.—On some of the New Jersey Transporation Company's locomotives, trussed parallel rods have been applied. These rods are much lighter and stiffer than straight solid ones or should be if properly proportioned, and are therefore preferable. Such rods have been used on steamboat engines for some time, but not on locomotives.

Knitting Machines.—We are frequently written to from various parts of the country asking where the best of the above machines can be had. Makers will do well to keep an advertisement in the Scientific American.

Manufacture in the West.—A large woolen factory is going up at Warsaw, Illinois. It is to cost $150,000, and will employ one hundred operatives.

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Collection of Projectiles.

A correspondent residing in Washington sends us a slip that contains the following facts in regard to a collection:—

A collection embracing all the different varieties of projectiles used during the war of the Rebellion. which has been made at the United States arsenal in this city, and systematically arranged in an apartment in one of the arsenal buildings specially fitted up for the purpose. Shelves are ranged completely round the room, while the center is occupied by two stands, upon which the shells and other projectiles are placed in regular order. In adnition to all the projectiles used by the Union forces, the collection includes a great variety of shells, solid shot, etc., many of English manufacture, which have been captured from the Rebels. Among those used by the Union forces we observed the James projectile, which was used to great advantage in the reduction of Fort Pulaski, in the earlier days of the Rebellion. The inventor unfortnnately lost his life while engaged in exhibiting his shells to several foreign officers and others. It appears that a workman attempted to remove a cap from a shell with a pair of pliers, when it exploded instantly killing the workman and General James, who was assisting him, and severely injuring several of the bystanders.

Several ingeniously constructed torpedoes, designed to be used in destroying the vessels of a blockading squadron, are suspended from the ceiling. Three of the torpedoes, taken from the James River, are constructed of common casks with conical floats attached to each end. They were to be allowed to float down the stream with the current, until they arrived in close proximity to the Federal ship-of-war, and were then to be exploded by means of a cord attached.

Upon one of the shelves we observed a number of singularly-shaped projectiles termed darts, invented by Floyd when Secretary of War, and by him forwarded to the arsenal for trial.

A collection of hand grenades of different patterns will engage the attention of visitors to the model room. One grenade is in the form of a hollow sphere designed to be filled with powder. From the outer surface a number of common gun nipples project, upon which percussion caps are placed. The grenades are to be used to repel an assault of an enemy upon a fortification, and as they explode with but slight concussion, they would undoubtedly prove exceedingly destructive to the assaulting party. The Adams grenade is made in a similer shape, only differing in the manner in which it is exploded. It is the invention of a private in the army, who had observed that the hand grenades in general use frequently failed to explode. The hollow globe contains the explosive matter and a common fuse, over which is placed a friction primer. To the primer a lanyard several yards in length is attached, one extremity of which is securely held in the hand of the person using the grenade. The projectile is thrown in any desired direction, and when it reaches the end of its lanyard, the friction-primer is suddenly jerked out igniting the fulminating powder in the fuse, and consequently exploding the grenade.

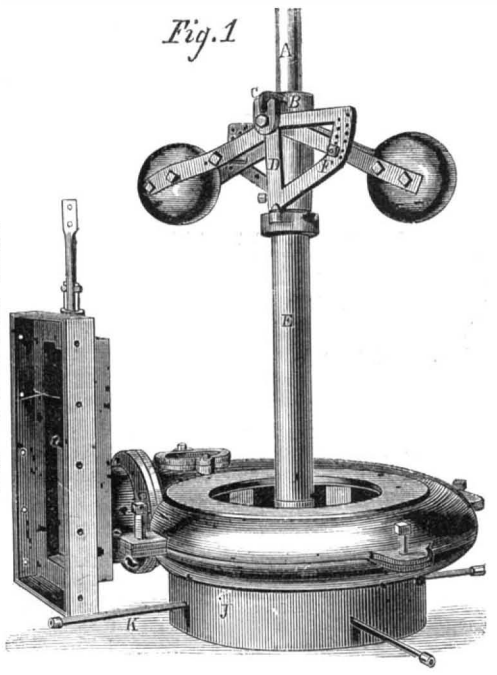
The collection contains a single specimen of a fire-ball, composed of highly combustible materials, which, when ignited, produce a powerful white light. It takes fire when discharged from the cannon, and is intended to be thrown in the direction of any point where the enemy are supposed to be engaged in throwing up intrenchments at night, in order that their correct position and the number of troops engaged in building them may be ascertained. The collection also contains a number of Hale's war rockets, which were extensively used in McClellan's Army during the disastrous campaign on the Peninsula.

The model room has been fitted up, and the shells and other projectiles carefully arranged under the supervision of Thomas Taylor, Esq., of the rifle-shell department. Every article in the collection is numbered, and Mr. Taylor is at present engaged in compiling a descriptive book to contain the names, distinguishing features, history, etc., of each individual shell or other projectile in the collection. We are informed that similar collections are being made at the Ordnance Department and Navy Yard, which will undoubtedly prove of immense benefit to army officers and scientific men interested in the matter.

LAKIN'S WATER-WHEEL REGULATOR.

Manufacturers who use water power know that it is as unsteady in action as any other motor, and the quantity admitted to the wheel must be governed by

Fig. 1

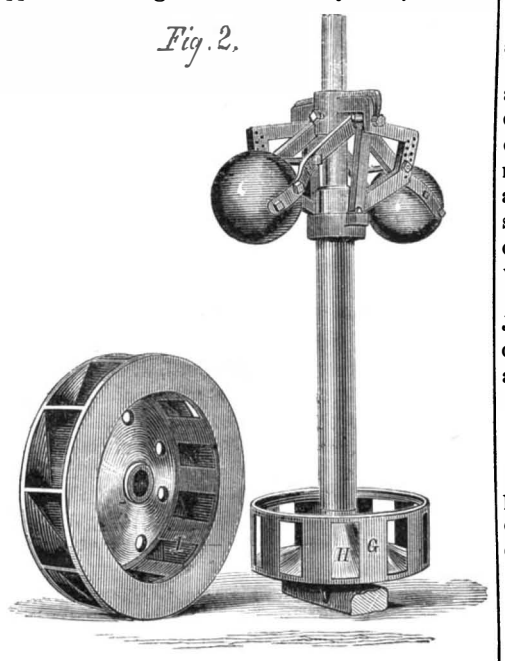


the duty to be performed at the moment, otherwise irregularities are manifest. This must be done by the wheel itself, automatically. It cannot be done by hand, for no human intelligence could foresee the precise moment when a machine was about to put on or off in the mill.

The apparatus here shown is to be attached to a central vent wheel, and controls the velocity of the same by obstructing or enlarging the issues. It also obviates in a measure, excessive weight and labor on the step, and instead of increasing the strain, diminises it. This end is attained in the following manner:—

The upright shalt, A, of the wheel has a collar, B, on it, with two projecting arms, C. To these the upper end of the governor levers are jointed, and also

Fig. 2.



the end of a bell crank, D. The other end of the same connects with a coller on a cast-iron sleeve, E, fitting over the main shaft, and the governor levers also connect with it through the medium of a bolt, F. The sleeve, E, connects at the bottom of a regulator valve, G, Fig. 2.

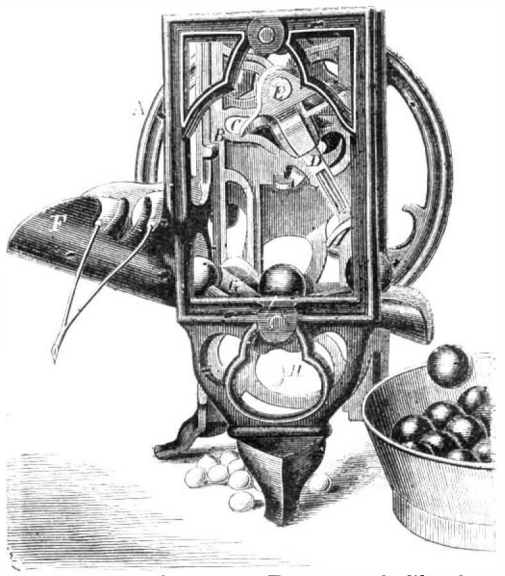
It is easy to see that, as the main shaft revolves, the governor will also, and that an increase or decrease of velocity will act on the balls and cause them to rise or fall, thereby affecting the position of the valve and its openings, H, with reference to the wheel and its issues, I. Any given velocity may be obtained for the main wheel by simply rasing the balls in the bell crank, D. The higher the point they are set at the greater velocity will be required in the wheel to raise them yet further.

Below the wheel is a water chamber, J, which has limited issues, as in the pipes, K. Upon this water, the result of leakage through the edges of the wheel and the scroll, the wheel and shaft rest in a measure, or in such a degree that great wear is obviated on the step.

A patent was issued on this governor to T. D. Lakin, on Oct. 13, 1863. This governor is manufactured by G. W. Davis & Co., Nashua, N. H., whom address for further information.

VAN KANEL'S CHERRY STONER.

This is a little machine designed to remove the pits from cherries that are to be preserved with sugar or dried. It is difficult to give a clear representation of this machine, owing to the nature of the framing, which is so open and light that the working parts become confused with it. In effect the work is done by turning a wheel, A. This has a pin in it which works a slide, B, inside the main frame. This slide rises and falls vertically by the action of the pin in the slot, C, and there is a fork, D, attached to it which receives the same motion; besides that, it ha



a movement on the center, E, very much like that given a paddle in moving a boat.

To stone the cherries they are taken by the stems and laid inside the trough, F, through notches in the edge. A little pull detaches them, and they roll down on to a table, G, which rises and falls alternately and throws one at a time under the fork, D; as it descends it pierces the cherry and pushes the stone out through the bottom, as at H, and by a dexterous flirt, throws the fruit out at one side into a vessel, completely pitted.

Rights for sale. For further information address Joseph Beare, Chester, Ill. Parties in Ohio and vicinity can address Babbitt, Harkness & Co., Nos. 18 and 19 Public Landing, Cincinnati, Ohio.

SPECIAL NOTICES.

Samuel Nye Miller, of West Roxbury, Mass., has petitioned for the extension of a patent granted to him on the 29th day of June, 1852, for an improvement in compound anchors.

Parties wishing to oppose the above extension must appear and show cause on the 11th day of June next, at 12 o'clock, M., when the petition will be heard.

Christopher C. Brand, formerly of New London, Conn., but now of Norwich, Conn., has petitioned for the extension of a patent granted to him on the 22d day of June, 1852, for an improvement in bomb lances for killing whales.

Parties wishing to oppose the above extension must appear and show cause on the 4th day of June next, at 12 o'clock, M., when the petition will be heard.

BACK NUMBERS.—New subscribers are informed that the back numbers of the present volume are out of print. Subscriptions are entered from the date of their receipt.

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Notes and Queries

C. L. R., of Tenn.—Good dipping acid for cast brass, is sulphuric acid, 1 qt.; niter, 1 qt.; water, 1 qt.; a little muriatic acid may be added or omitted. A lacquer is 95-100ths alcohol 2 gallons; seedlac, 1 lb.; gum copal, 1 oz.; Eng. saffron, 1 oz.; anatto, 1 oz.

W. Y. G., Ky.—We have read your communication in relation to the safety valve and its proper control or removal from liability of being tampered with by locking it up. In some parts of the country they are now used but that does not prevent explosions. If all the safety valves were taken off we sometimes think it would be a good idea, for then engineers would examine their boilers oftener and depend upon their own brains for safety, not on the mechanical action of a brass disk and a 90-pound ball on the end of a bar four feet long.

G. C., of N. Y.—We are much obliged to you for writing us such a long letter on gears, but we are sorry to say it is almost undecipherable. Few compositors could make it out.

D. A., of Mo.—It seems to be a general law that all metallic surfaces will weld or adhere together if brought in sufficiently close contact in a perfectly pure, bright state. Steel tubes have been welded together cold by drawing them through a die which reduced their size, and the plating of copper with silver by passing sheets of the two metals through rolls, has been extensively practiced. The interposition of any substance, whether fluid or solid, would prevent the welding.

L. E. B., of N. Y.—A balloon filled with hydrogen gas must have a capacity of about 14 cubic feet to lift one pound, and 2,000 feet to lift a man—equal to a tank 10 feet square and 20 feet deep.

T. A. M., of N. Y.—To get the solid contents of a cylinder, multiply the area of its cross section by its length; the area is obtained by multiplying the square of the diameter by 07854. A United States gallon contains 231 cubic inches.

J. T. E., of Mich.—Kerosene lamp wicks are made of the length which is supposed to be most convenient and acceptable to those who use them. If made longer they would fill the lamp too much.

W. W., of R. I.—To filter water in its passage from one cistern to another, let it pass through porous earthen ware.

J. C. R., of N. Y.—In the case of two siphons of the same size and having the ends of their longer legs at the same level, the one rising 5 feet above the surface will draw off water faster than the one rising 20 feet; in consequence of the greater friction of the fluid in its passage through the longer pipe. Immersing the lower end of the longer leg in water will not stop the flow.

W. M. J, of——.—Broom corn is bleached by spreading it on the grass. It could doubtless be bleached, like other vegetable substance, with sulphurous acid or chlorine. Hang it in a close cask or chamber and burn sulphur in the chamber, or treat it with bleaching powder.

H. C R., of Ill.—In the common cheap spiral spring scales, the indicator in fact travels over less space in the last pound than in the first, but so little that no compensating arrangement is necessary.

T. W. P., of N. Y.—A large portion of the heat is carried out the chimney—the proportion varying very widely in boilers of different construction. A plan for entirely preventing this loss, which has received much attention, is to work the products of combustion through the cylinder—as in Roper's air engine.

S. H. W., of Del.—Many gases will extinguish fires provided the fires are in air-tight rooms where the gas may be kept in contact with them. The idea of using any gas practically for extinguishing fires in the open air is ridiculous, as it is manifestly impossible to confine the gas so as to smother the fire. Water is absolutely perfect as a material for putting out fires, as it can be easily thrown upon the fire, and by its great absorption of heat it cools the burning body below the temperature at which combustion takes place.

J. U. R., of Ill.—Water will flow more rapidly through a half inch hole in the bottom of a tub than through a half inch pipe four feet long. The friction of pipes very materially obstructs the flow of water. We know of a man this winter laying down a half inch pipe quarter of a mile long, and he got so little water through it, that he took it up and laid an inch pipe in its place.

Temperature, of N. Y.—A new work on vapors by Regnault is announced in France.

H. M., of C. W.—We advise you to purchase a good filter already made. Perhaps a fine flannel at the bottom of your filter would have prevented the passage of the charcoal. Porous earthenware makes an excellent filter.

A. F., of C. W. and H.B. S., of Wis.—For comments on Danford's boiler, see page 387 of our last volume.

A. O. S., of N. Y.—Iron is coated with silver by the electroplating process.

J. P., of Iowa.—Makin's Metallurgy treats of refining gold. Apply to Henry Carey Baird, of Philadelphia for it.

A. P., of Ky.—The specimen is iron pyrites—sulphide of iron.

A. O. B., of Vt.—The notion that water wheels run faster by night than by day is the result of careless observation; it has been ascertained by accurate measurement that they run no faster.

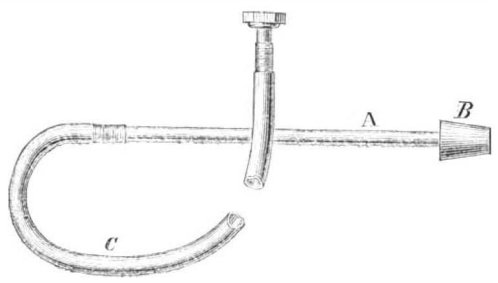
J. P., of N. Y.—Certainly, you are right; "I done" is not grammatical; your friend should say, "I did."

H. R., Ohio.—There is no current that will hold vulcanized rubber to iron so that will not come off.

Correspondence

Cleaning Boiler Tubes.

MESSRS. EDITORS:—Upon seeing in your issue of the 17th inst., a description of a recently patented "device for cleaning tubes of boilers," I am induced to describe to you, and, by your permission, to your readers, one substantially equivalent—though more simple—which has to my personal knowledge been in regular use in one establishment in this city, for more than two years. In the engraving, A, is a piece



of one-inch gas pipe some three and one-half feet long. It serves, when grasped with a stout pair of gloves or other protection for the hands, as a handle to direct the nozzle, B, which is simply a conical piece of wood driven on the pipe into the ends of the flues. To A is attached some six feet of heavy rubber hose, C, which terminates in a union coupling, whereby it is readily attached for use to a small branch steam pipe, which is controled by an ordinary globe valve. Further explanation is needless.

I may remark that the boiler to which this is attached has been in constant use, carries eighty pounds steam, has fifty-seven three-inch return tubes fifteen feet long, and burns almost entirely bituminous coal. With this fuel, the tubes of such a boiler, of course, require very frequent cleaning, yet no part of the above-mentioned apparatus has required the slightest repairs during the time named.

The question, "Is the true pitch of a gear an arc of a circle, or the chord of that arc?" may seem to you and your readers to have been worn threadbare. But I have not yet seen the subject approached from the point of view which seems to me the clearest and most conclusive. The original conception of a pair of spur gears is tangibly expressed by two cylinders, rolling in contact, without slipping. And if it were practicable to produce sufficient friction for ordinary purposes, the case would end there, the motion would be perfect, and no one would doubt that their respective diameters must be exactly in inverse proportion to their required velocities of revolution. But simple friction is not sufficient. It is necessary to place a regular series of projections upon the rolling surfaces, and of course to cut corresponding alternate indentations below them. The original surfaces are thus lost, but are represented by imaginary lines called pitch circles. These projections, with the material left between the indentations, become teeth; and when they are so formed as to transmit precisely such a motion as the original cylinders would have done (with the least lateral pressure, and the greatest attainable strength consistent with such a form), the conditions of the case are satisfied, and not otherwise. Now, if we imagine a pair of cylinders, say as **2 : 1**, properly placed in contact, and suppose one-half their width (or face) to be left cylindrical, and teeth to be formed on the remaining half, it seems needless to require any demonstration beyond that of the trained common sense of any intelligent mechanic, that the wheel must have precisely twice as many teeth as the pinion, and that the true pitch is the arc of a circle measured on the original surface of contact (or pitch line), and will subtend precisely twice as great an angle in the pinion as in the wheel.

CALLIPERS.

Worcester, March 19, 1866.

Large and Small Pulleys.

MESSRS. EDITORS:—I notice in your paper a little controversy in regard to the power of different size pulleys. In getting up an improved hoisting machine lately, I made an experiment that may throw a little light on the subject. I found that when two equal weights were suspended across a pulley, say, for instance, two 50lb weights across a one-foot pulley, it took a certain amount of weight on either side to make either preponderate. If the pulley was doubled in size—made two feet—it would take just one-half the amount that it did before to make one go down.

Now, suppose that you have two pulleys geared together on two parallel shafts; one pulley is ten times the diameter of the other; suppose that two weights are suspended from either pulley to make the balance—one would have to be ten times the weight of the other. Now suppose that one ounce laid on the light weight would cause it to go down, would it not take ten ounces on the heavy weight to make it do the same (supposing that the one ounce is taken off). This, I think, is the correct theory of the matter. But would it not, if the difference was much greater in the weights, take more weight or power on the light weight to make it go down from increased friction on the bearings of the pulley attached to the heavy weight?

GEO. BROWNLEE.

Princeton, Ind., March 15, 1866.

[We should think not; as the light weight would be applied to the longer arm of a lever, and could thus overcome more friction.—EDS.

Dead Surface on Silver,

MESSRS. EDITORS;—Will you please inform me how the very white surface, seen on the inside of silver mugs and goblets, is produced? Will it bear much rubbing, without becoming polished?

C. WASHBURN.

Bridgewater, March 26, 1866.

[Even what is called pure silver ware is made from silver coin which contains a small proportion of copper. If the ware is heated red hot in contact with the atmosphere, the copper at the surface is oxydized, and the oxide may be dissolved in dilute sulphuric acid. The usual method of heating the ware is to place the vessel on a slowly-revolving turntable, and subject it to the action of a flame formed by two currents—one of illuminating gas, and the other of atmospheric air—caused to mingle as they issue from the jet. The current of air is driven through its pipe by a fan, and produces a flaring flame a foot or more in length. After the heating, the vessel is placed in a bath of warm diluted sulphuric acid, which dissolves the little particles of oxide of copper, and leaves the silver surface a pure and beautiful lusterless white. It is easily polished by being rubbed with a tool of steel or bloodstone.—EDS.

The Solubility of Salt,

MESSRS EDITORS:—Will you please answer, in your paper, two questions which puzzle me, but which may be very simple. The first is, "Why does salt not dissolve in hot water in larger quantities than in cold?" All *other* soluble substances dissolve more readily in warm than in cold water, and the explanation is that in warm water the particles are further apart, owing to the expansion by heat, thus allowing more of the particles of the soluble substances in the interstices. Why does this not apply to salt?

F. T. E.

Boston, March 15, 1866.

[We must leave to our correspondent the task of reconciling his explanation with the facts. For our own part, the power of one substance to dissolve another is an unfathomable mystery, for which we have never seen any satisfactory explanation. According to Poggiale, 100 parts of water dissolve 35·52 of salt at 32°, 36·98 at 122°, and 39·61 at 212°; showing salt to be slightly more soluble in hot than in cold water. Sugar, however, is more soluble in cold than in hot alcohol.—EDS.

Formation of Anchor Ice.

MESSRS. EDITORS:—In reading your valuable paper of 17th ult, lately, my attention was directed particularly to the article "Water freezing at a depth of twenty-five feet" at the water works of Chicago, and the explanation of the cause of the phenomenon and remedy proposed by Professor Douglass, of Michigan University. The Professor may be correct, but I have a case similar in some respects, that I think cannot be explained on the principle of radiation.

I procure the water for my steam mill through lead

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pipes, from a large stream. Above my mill one-half mile is a dam, four hundred yards below my feed pipe is a riffle, and at low water my pipe is about two feet and a half under water. In January, 1856, the river was very low, and we had a remarkably cold snap that froze the river over nearly solid at the riffle. The mill above run by heads part of the time; the ice formed over my pipe twelve inches, and while running my pumps stopped. Upon cutting away the ice, I found the end of the pipe closed with ice in the form of wool or mush ice, and when removed from the end of the pipe, it seemed to be heavier than the water. Along the pipe, on the bottom, ice had formed notwithstanding the water was from twelve to eighteen inches deep. After clearing the ice away, I put on the pumps again but with the same result, and I was in consequence compelled to stop my mill until the weather moderated.

DAVID MCCURRY.

Ottawa, Putnam Co., Ohio, March 18, 1866.

[Water, like other substances, expands when heated, and contracts when cooled; but this law does not hold at all temperatures. The maximum density of water is at 39.2° Fah. (39.85° according to some authorities). If cooled below this temperature it expands down to the temperature 32°, when it crystallizes, and in crystallizing it expands about one-ninth of its volume; the specific gravity of ice being 0·925 to 0·950. If water continued to contract by being cooled down to the freezing point, lakes and ponds would be frozen solid to the bottom, but as the greatest density is at 39.2° when it has all been cooled to that temperature the vertical circulation ceases, that at the surface only is cooled to 32°, and is frozen, while the principal portion remains at a temperature of 39·2°.

In the case cited by our correspondent the whole mass was mingled together by the broken current, and was thus all cooled down to the freezing point or probably below, as water, like other fluids, does not crystalize when in violent motion. It froze first on the bottom because the water was stiller there, and because crystals of ice, like other crystals, are apt to attach themselves to some solid substance. It would be more likely to freeze upon the lead pipe because lead is a good conductor of heat, and would convey away more rapidly the 140° of latent heat released in the act of crystalization. Anchor ice generally forms, as in this case, either in rapids or at the lower end of rapids, where the water by being tumbled and mingled is all brought to the surface, and, therefore, all cooled as low or lower than the freezing point.

In the case of the Detroit water works this condition does not obtain. It seems to us that that case requires further and more careful observation to unfold its true explanation.—EDS.

The Way to Make Magnets.

MESSRS. EDITORS:—Can you give me the process of making cast iron magnets? N. H.

Lowel, Mass., March 19, 1866.

[To make a cast iron magnet, take a smooth bar of cast iron, place the middle of it on the north pole of a magnet, and draw it to the end, repeating the stroke always from the middle to the end, that is rubbing the same way every time. Then place the middle of the bar on the south pole of the magnet and rub it to the opposite end of the bar, repeating as before. Instead of a straight bar you make it in the form of a horse shoe, or in the form of a star with six rays. You may make it of hard steel or cast iron. When made, lay it on the table, spread a smooth sheet of writing paper over it, and sprinkle clean iron filings on the paper. In the case of a star magnet the figures are very curious.—EDS.

Counter-weighting Machinery.

MESSRS. EDITORS:—I have read with interest an interesting article on counter-weighting machinery in your issue of the 27th inst., and as experiments upon the effects of counterbalancing are somewhat rare, and many erroneous ideas exist about this matter, I have thought best to communicate the result of some experiments in this line made in 1863 upon a scroll saw. The reciprocating parts of the machine weighing from 2 to 6 lbs. were connected by a rod some 15 inches in length to the crank wheel—speed of the machines was from 1,000 to 1,500 revolutions per minute, with a stroke of from 3 to 5 inches. When the mills were run without a counter-weight, the plan of vibration was formed to coincide with the line of the connection and reciprocating parts. The application of a counter-weight equal to the weight of the connection, slides, etc., changed the vibration to a right angle with the line of the connection and slides, while weight equal to one-half the reciprocating parts applied to the crank wheel was found to neutraiize one-half the vibration in the line of the connection and communicate it in the other direction, or, in other words, to remedy the matter one-half, from which I make the following deductions: The reciprocating parts of steam engines, saw mills, scroll saws, etc., can only be balanced by bodies of equal weight having a coincident movement applied in or nearly in the same plane of movements; the application of an equal weight to the opposite side of the crank wheel, is worse than no counter-weight, the "remedy being worse than the complaint," and as a general thing, the vibration is thrown in the direction in which the framing is least able to withstand it—a half balance applied opposite the crank pin is the best compromise we can make as a general rule, while in many cases the difficulty may be almost entirely overcome in special machines where the conditions of their arrangement is known to the builder. For instance, a crank shaft with its bearings bolted down upon masonry. can withstand the want of balance in a vertical direction. The same conditions apply to the locomotive driver, the weight of the engine neutralizing the effect, while in floors their strength and capacity to resist the effects of vibration and jar is in a horizontal direction.

By carefully observing these conditions, reciprocating machinery may be driven at a high speed without injury to buildings and inconvenience from jar and vibration communicated to floors.

J. RICHARDS.

Columbus, Ohio, March 23, 1866.

The Truth in Regard to Witch Hazel.

MESSRS. EDITORS:—It is strange to see with what tenacity mankind are prone to hold on to old superstitions. The most absurd ideas find defenders sometimes in those who profess to be learned. The witch hazel is a case at hand. Your correspondent, "C. M. S." undertakes to enlighten you upon the subject in a kind of a two-fold manner, partly scientific, partly something else. He tells you of the infallible certainty of the rod to turn at the right spot when in the hands of properly constituted operators, which operators are qualified either "electrically magnetically or otherwise," thus insinuating that a common person would not succeed. There is considerable policy in this; for if at any time an operator should fail, the plea could be set up that he was not properly constituted—or in plain English, that he was not a "Water Witch."

But he tries to explain the scientific part of the operation upon the strength of fluid attraction, yet he says that the rod after bending to the earth, [why does it not stop there?] resumes its upright position. A strange attraction indeed, that will attract a thing to the earth and then attracts it away again.

Certainly any one who has ever tried the operation without prejudice, will come to the conclusion at once that it is the position in which the rod is held that causes it to turn. There is a certain point at which not only the rod, but also the muscle of the arms are subjected to the least strain, and this is the point where the rod invariably stops. This point may be found by keeping the elbows close to the sides and holding the rod in such a position that it points directly toward the eyes of the operator. Water witches hold the rod in a perpendicular position, from whence it revolves until it reaches the point; but let them put the rod in this position at first and they may stand till doomsday before it will turn.

This is the point at which your correspondent says the rod has expended its electrical or other force in the vibrations—vibrations caused by the straining of the rod and the twitching of the nerves in an unnatural position.

But let him (perhaps he is not qualified) try it with the rod a few inches below this position—or positively downward—even half way round; nay let him lie down on his back, and he will find that the rod will invariably stop when it comes to this point—the point where there is naturally the least strain. Nor is hazel the only wood that will do. You may take a hazel or any other kind of a twig, prepared in a certain way or not prepared at all—hold it over the Atlantic ocean, the result will ever be the same. If you hold it in the proper manner it will turn, if you don't it will not. PROGRESS.

Fairfield, Iowa, March 15, 1866.

Probable Existence of a Great Cavern Under Lancaster, Pa.

MESSRS. EDITORS.—It is a well settled belief among many of our most intelligent residents, that underneath the city of Lancaster and vicinity their exists a vast cavern. Many facts are recited giving extreme plausibility to this theory, the most important of which may be briefly stated, as follows:—

The city is located within the great limestone belt extending across the south-eastern part of the State, and of all the geological formations limestone the most abounds in caverns, many of which are known to be of vast extent. In sinking wells in certain parts of the city, the bottom crust breaks through before reaching water, and the pump is suspended from above by chains.

There have been several well authenticated cases in the vicinity of the city, of the crust of the earth breaking and engulfing farm animals. In two instances men engaged in plowing, saw their teams disappear beneath the surface and only a funnel-shaped cavity remained to mark the spot.

The earthquake of Sept. 29, as well as several lighter shocks, may be very reasonably accounted for by this theory. Huge masses of rock breaking from the roof of the cavern and falling into the depths beneath may cause such a quaking of the upper crust and dull rumbling noise as that which astonished the inhabitants on that day.

One of the most convincing proofs of the existence of this subterranean cavity is the discovery of an eyeless catfish in the waters of the Conestoga, a stream flowing past the city and supposed to connect with the hidden waters beneath. This fish is entirely destitute of organs of sight, having only small spots in place thereof.

In a celebrated grotto of Italy eyeless fish have been found, and it is inferred that the eyeless catfish of the Conestoga must originate in a similar underground locality and escape through the fissures of the rocks. I have endeavored to present as concisely as possible the principal facts bearing on the theory, and leave it for others to elaborate. WALTER SCOTT.

Columbia, Pa. March, 20, 1866.

Where the Day Changes.

MESSRS. EDITORS:—Where does a day begin? For instance, to day, March 12th, 12 M., at New York, it is 12 midnight at the point on the other side of the world; and at one o'clock, P. M., at New York, is it one o'clock March 13th or March 12th A. M. there? That is, are they a half a day ahead or behind New York. F. T. E.

Boston, March 15, 1866.

[The reckoning of time has been carried from the civilized nations of Europe in both directions—eastward across the continent of Asia, and westward nearly across the Pacific ocean. At all points east of Greenwich, it is later in the same day, and at all points west it is earlier in the same day. The place of meeting is in the Pacific ocean just off the eastern coast of Asia. It is Sunday on one island at the same time that it is Saturday on another island a short distance to the eastward.—EDS.

THE ORCHESTRION.—This is the name of an automatic instrument brought to this city from Germany and intended to imitate a band of music. The general construction is similar to the organ, with cylinders and tangents to supply the place of the manuals. Trumpets, drums and cymbals predominate, however, in many of the pieces. It was exhibited at the great London exhibition of 1862, and has been till recently the property of the Grand Duke of Baden. It is a most ingenious piece of mechanism, but it is stated would be much improved with larger cylinders, whereby something more than the mere skeleton of an overture could be performed on it.

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IMPROVEMENTS IN GOLD AND SILVER AMALGAMATING.

BY THOMAS BETTY

One of the difficulties met with in the extraction of gold and silver from their matrices by amalgamation is what is known among miners as the sickening and flouring of the mercury used for that purpose. In this state the mercury is tarnished on the surface, its amalgamating action is greatly reduced, and when triturated in the amalgamating machines it breaks up into minute particles, which will not again unite, and are carried off with the slimes, so that with many ores the loss of mercury forms a considerable item in the cost of extracting the precious metals. Mr. Crookes, F. R. S., the editor of the *Chemical News*, has, however, recently made a discovery which promises to obviate this difficulty, and prevent this great loss, and which will make his name as well known among the mining public as it has long been in the scientific world for his chemical researches, and especially for his discovery of thallium. It is, that by the simple addition of a small quantity of the metal sodium, the sickening of mercury is entirely prevented. floured mercury immediately brought together again, and the amalgamating action of ordinary mercury vastly increased. It is found that a surprisingly small amount of sodium is sufficient to effect the clearing of fouled mercury. It will require a longer series of experiments than there has yet been time to carry out, to determine the smallest effectual proportion, but it has already been proved that one twenty-thousandth part of sodium, added to the mercury, is amply sufficient, so that this discovery has the great advantage of cheapness to recommend it. Sodium may even now be obtained in large quantities for five shillings per pound, and if a demand were to spring up for it, its price would be greatly reduced; but, calculating at the present price of the metal, and using the quantity that experiments have proved to be amply sufficient for any description of ore, the cost is a mere trifle, in comparison with the advantages gained. With the ordinary amalgamating troughs in gold mining, one hundred and twenty pounds of mercury are used to each set of four stamps, reducing four tuns of quartz in twelve hours; and supposing the supply of sodium to be renewed every twelve hours, the cost would be less than one penny per tun of quartz treated, which would certainly be more than covered by the less of mercury prevented, without reference to the greater quantity of gold obtained, in consequence of the improved condition of the mercury.

Mr. Readwin, in a series of experiments at Gwynfyndd and Castell Carn Dochan Gold Mines, in North Wales, has found that when sodium is added in excess, its effect is injurious instead of beneficial. Some sodium having been placed in my hands for trial, by the discoverer of its new use, I have been able to ascertain its effect upon mercury, and also upon the different minerals usually associated with gold in lodes, and the results obtained throw considerable light upon its action, and seem to account both for its beneficial effect in small, and its prejudicial effect in large, quantities. They can, however, only be considered approximate, and more suggestive than decisive, but they are sufficient to show the great value of the use of sodium in the amalgamation of the precious metals, and indicate its probable action. The experiments were made with mercury containing one per cent of sodium.

1. When a little of the sodium amalgam was added to ordinary mercury, the affinity of the latter for gold was greatly increased, so that when pieces of gold were dipped into it they were instantly covered with mercury, although when dipped into mercury to which no sodium had been added, amalgamation was very slow and difficult to obtain.

2. Floured mercury immediately ran together into a single globule on the addition of a little sodium amalgam.

3. When the iron pyrites (bisulphuret of iron), magnetic iron pyrites (sulphuret of iron), or copper pyrites (sulphuret of copper and iron), were triturated with sodium amalgam, the pyrites were decomposed, and on the addition of water, a black precipitate of sulphuret of iron was obtained.

4. Triturated with sodium amalgam: *a*. Arsenical pyrites were decomposed and arsenic amalgam formed; *b*. Galena (sulphuret of lead) was decomposed, and lead amalgam formed; *c*. Blende (sulphuret of zinc) was decomposed, and zinc amalgam formed; *d*. Litharge (oxide of lead) and white lead (carbonate of lead) were decomposed, and lead amalgam formed.

From these experiments it appears that sodium amalgam has an energetic action upon both the oxides and sulphurets, reducing both; and as the sickening and flouring of mercury is supposed to be due to the formation of the protoxide and the sulphuret of mercury, its beneficial effect appears to lie in the reduction of these; but if added in excess, it will, after effecting this operation, attack the ores of the baser metals, and with many of them form amalgams. The mercury then becomes loaded with the baser metals, and its action upon silver and gold is greatly reduced. When arsenical pyrites are contained in the ore treated, the arsenic amalgam formed by the action of the excess of sodium floats on the surface of the mercury, and prevents the gold from coming in contact with it. It is thus seen that only sufficient sodium should be added to reduce any mineralized mercury, and to keep it in an efficient state. The quantity added, and the duration of its effect, will vary with different kinds of ore treated, as it is well known that some minerals sicken and flour the mercury much more quickly than others. The whole question of the fouling of mercury when used for amalgamation requires a much more careful chemical examination than it has yet received, and it is a matter of great importance to miners that the attention of so able a chemist as Mr. Crookes has been directed to the subject. Already a discovery of unquestionably great value has been made, which will soon be taken advantage of wherever gold is extracted from its matrix, and we can only hope that the discoverer will participate largely in the profits which will be realized by the use of his discovery.—*London Mining Journal.*

The Earth as Seen from the Moon.

The inhabitants of the moon perceive in their sky a gigantic star, constantly immovable at the same hight. To their eyes this globe is twelve times as large as the sun, but it differs from all the stars in being always suspended in the same place over their heads. It presents phases to them as the moon does to us, passing through all the gradations of new and full earth. This star, as we have just said, is the earth we inhabit.

Those who dwell in the center of the lunar disk behold our globe suspended from their zenith, hovering eternally in the midst of the starry skies. Others see it at 70 deg. of elevation, others at 45 deg., as they inhabit spots more or less removed from the center of the visible hemisphere. Those who live near the border of this hemisphere, see our globe on their horizon resting on the mountains. A little further on only half the earth is discernible, and in passing to another hemisphere the view vanishes for ever.

If we except the determination of longitudes, the earth is more beautiful and useful to the moon than the moon is to the earth; and if the Selinites, or inhabitants of the moon, rolling underneath us, interpret the law of final causes with as much partiality as we do, they will have a right apparently superior to our own for regarding creation, the earth included, as especially made for the Selinian race.

The earth is a gigantic globe, sending them thirteen times more light than the full moon transmits to us. It revolves on its axis in twenty-four hours, and during this period exhibits all portions of its surface, being thus more generous than the moon, which always conceals one hemisphere from our view. In consequence of this motion, the Selinite finds himself in an observatory magnificently situated for viewing the terrestrial disk, and his position is preferable to that of the inhabitants of the first four moons of Saturn, who can never see the whole of that planet; and they can see the earth better than we see any planet.

The earth generally presents to them a greenish hue, in consequence of the immense quantity of water by which its surface is covered, of the forests of the new world, and of its plains, and also on account of the tint of its atmosphere. From time to time, however, large gray or yellow spots divide the sphere. To the east of the terrestrial disk appear the lofty Cordilleras, marked by a long indented line just as we see in the lunar Carpathians, to the west of the Sea of Storms. Opposite this ridge, a shady green spot of great extent unfolds itself for many hours; this is the great ocean. Next comes two gray patches, which look like one elongated; these are the two isles of New Zealand. Then appears the fine continent of Australia, tinted with a thousand colors, and accompanied by New Guinea, Borneo, Java, and the Philippines. At the same time the gray country of Asia is unrolled, and extends to the white steppes of the pole. Africa then comes in view, divided by its milky way of sand. To the north of the great Sahara, appears a little green spot torn in all directions and full of ramifications; this is the Mediterranean; above which those who have good eyesight will discern little, and almost invisible, France (!) Then the dry land will disappear, and the great dark spot of the Atlantic will follow the same revolving course. The Selinites who carlessly contemplate in tranquil nights the green and gray divisions of the earth, will have no idea of the contests in which the distant nationalities are involved.

The earth is a permanent clock to the inhabitants of the moon, and this is not its least utility. By reason of its invariable movements, the fixed points which mark the different longitudes will be the hours on the meridian of the moon. Each country of the globe has its peculiar aspect, and may serve for point of departure.

The phases the earth presents to the moon will, in the same manner, serve as an almanac, and we may believe they form its chief foundation. These phases are complementary to those which the moon presents to us: when it is full moon to us, it is new earth for the Selinites; and when they give us a new moon, we offer them a full earth. No reciprocity can be more perfect and constant.

But the phases of the earth differ essentially from those of the moon, inasmuch as their intensity, not their magnitude, changes perpetually. Thi sphenomenon is very terrestrial, and we may be sure the Selinites have judged us by it long ago. While with them all is calm, identical, constant; with us everything changes. Besides the different luster of different parts of the terrestrial spheres—green continents, blue seas, yellow deserts, white poles, and gray lands—our atmosphere is in perpetual commotion. One day it is covered with clouds, and transmits to the moon a uniform white light; the day after it is of limpid transparency, and allows the solar light to fall upon absorbent green surfaces. All of a sudden it will be varied with flocculent mountains and varied mosaics. Thus the light the Selinites receive from the earth—the light which we call "ashy," and which we only perceive in the moon's early days—varies continually in intensity.

This mobility, this perpetual variation in the aspect of the earth, will have made the Selinites believe that the earth is uninhabited. But on what grounds would they form opinions unfavorable to its habitability? They live on a solid and staple sphere, and can see nothing like it on earth, Can any rational creature live upon that permanent atmospheric layer which covers all the earth? A Selinite who fell into it would be drowned. Can it be on that sheet of green that washes the greater portion of the earth? Can it be on those clouds that appear and disappear a hundred times a day? And then the earth turns with such velocity, it is subject to so much elemental instability! Moreover, can we belive that its inhabitants are people without weight, preserving, no one knows how, a mean position between the fixed and mobile elements? How can such existences be believed?—*Cosmos.*

THE hospital records show the enormous aggregate of 253,000 Union soldiers to have died on battle-fields and in hospitals during the war, to suppress the Rebellion. This does not include those who died at their homes of lingering disease contracted in the service.

IT has been ascertained that sheet iron may be protected from oxidation by coating it with a thin fused layer of magnetic oxide. For this purpose it is embedded in native oxide of iron in a state of powder, and kept at a red heat some hours.

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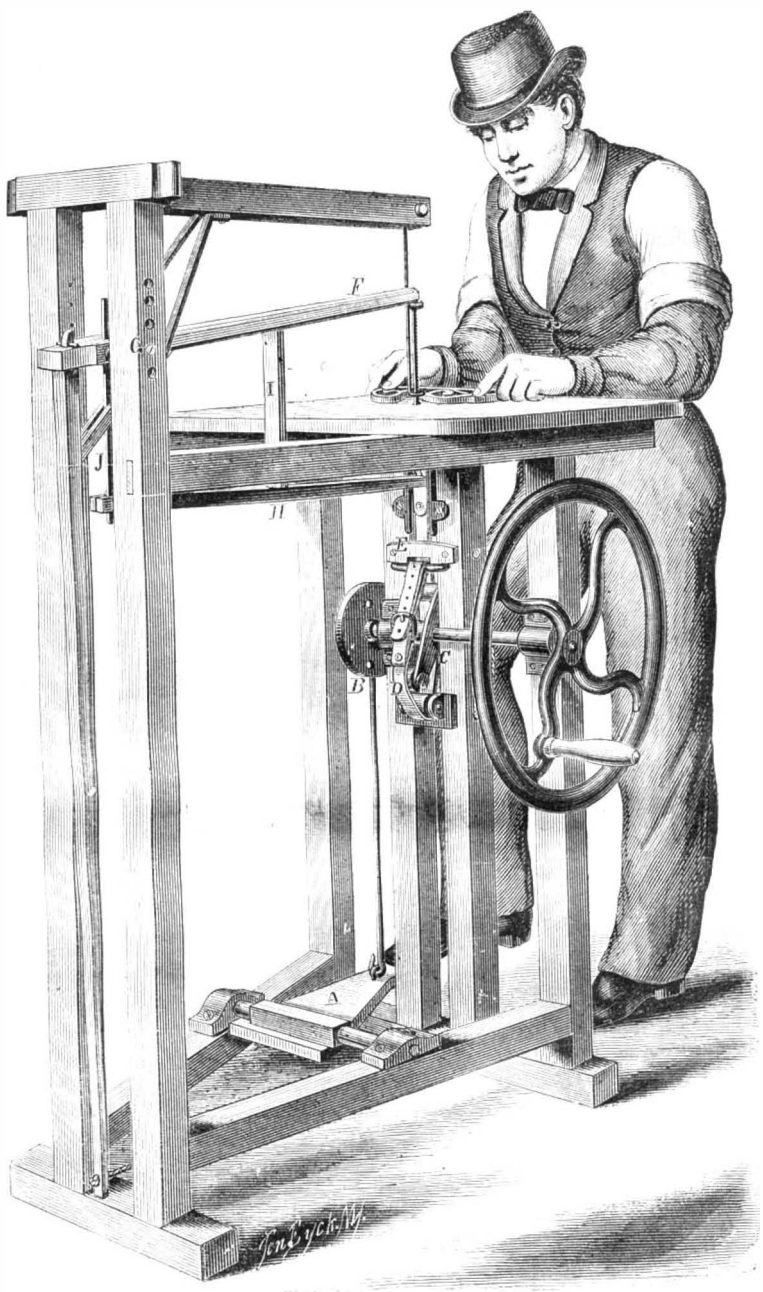
Improved Scroll Saw.

Very many ingenious contrivances for operating scroll saws have been invented, and the work is done by them accurately and speedily.

We illustrate herewith a device for changing the rotary motion of the treadle into a reciprocating movement, applicable to a jig saw, and that by a few parts which work with little friction.

By referring to the engraving it will be seen that the treadle, A, connects to a crank wheel, B. On the haft which carries this wheel there is an arm, C, with rollers fitted to the ends. This arm revolves within a strap or endless belt, D, one end of which is fastened to the frame below and the other attached to the sash, E, of the saw. These are the principal details.



TALPEY'S SCROLL SAW.

The operation is as follows:—The saw is attached to a lever, F, which works between the upright timbers, G. At the other end of the lever, or part projecting from the fulcrum, there is a piece of wood formed into a spring, or so connected to the bottom of the frame by a cord that the elasticity of the wood answers the purpose mentioned. This always keeps the saw strained tight and brings both parts of the strap, D, together. Now, as the arm, C, revolves, it pushes this belt apart and thereby brings the saw down, the spring before mentioned immediately returning it, or keeping such a strain upon it that the belt is drawn straight again in readiness for another stroke. The action of this machine is very easy and without jerks, which tend to bend and break saws of this kind, especially when working in short curves. It is very easily got at to clean or oil, and is without intricate parts to clog with sawdust or get out of order. Saws of different lengths are easily and quickly strained between the upper lever, F, and the lower bar, H. Between these two there is a vertical brace, I, which fits into shallow notches in each; at the upright timbers there is a rod, J, with holes in it. This rod is let out or taken up to accommodate saws of any length.

The stroke of the saw is also quickly adjusted to suit different kinds of work by altering the length of the belt through the agency of the buckle, and a quick motion can be given by altering the throw of the crank in the wheel, several holes being provided at different distances from the center, to screw the pin in, this causes the treadle to raise more or less, which, in turn, affects the velocity of the wheel.

Patented through the Scientific American Patent Agency on Dec, 26, 1865, by Jos. A. Talpey; for further information address Wm. H. Hoag & Brother, sole manufacturers, and agents No. 222 Pearl street New York, where the machine can be seen in operation.

Aeronautical Society of Great Britain.

This is a new Society recently formed in England, by the exertions principally of Mr. F. W. Brearey. On the 28th of February a meeting of the council was held at the residence of the Duke of Sutherland, when Mr. Brear read a paper in which he gives this account of the formation of the Society:—

Impressed greatly with the belief that, holding moderate views, an aeronautical society would be supported even by those who made all preceding attempts a subject of ridicule, I went down to Birmingham, by the advice of Mr. Glaisher to make certain simple suggestions, and at that meeting the nucleus of that society was formed.

Mr. Fairbairn, when asked to join the council, expressed an opinion that the objects of the society were Utopian, but upon repeating to him the substance of the suggestions made at Birmingham, he consented to act. Those suggestions were founded simply upon the accomplished results of a machine capable of floating in the atmosphere, whose course was guided entirely by the direction of the wind, and the well-known fact that different currents are met with at uncertain elevations, and even to the extent of opposite points of the compass. To make our floating machine more useful, it is necessary to invent some plan by which it may ascend and descend without loss of gas or ballast, and so move into those currents which are favorable to the desired course.

Those currents may possibly be found more regular than is imagined, and it is only by repeated ascents with that object in view that the truth can be ascertained. No elaborate or expensive machinery will be required for the object advocated, and its successfull achievement will economize the consumption of gas, and save the great weight of ballast otherwise necessary to take up.

To aid this object there will naturally follow improvements in the varnish for balloons, so as to render them impervious to the gas, as also a mode of fastening down the balloon to the ground in a manner least resistant to the wind when it should become necessary to anchor.

In the French war balloons a cover was thrown over all and strongly fastened to the ground, so that, in fact, an inclined surface was presented to the force of the wind in every direction.

The present plan for lowering a balloon in the air, is to open a valve in the top and let out a portion of the gas; while the balloon is made to ascend by throwing overboard some ballast. Mr. Brearey proposes to carry a quantity of liquified gas to supply the place of that which is allowed to escape; he also proposes to raise and lower the balloon by beating the air with wings, by means of the muscular force of the aeronauts. This might work if the air was of the same density at all altitudes, but the density of the air varies so much with the altitude, that he will be able to move his balloon by muscular force a short distance only from the stratum of air with which it coincides in specific gravity.

INDUSTRIAL ACTIVITY AT PITTSBURG.—There are now over 500 large manufacturing establishments in Pittsburg suburbs, among which are 50 glass factories, 58 oil refineries, 31 rolling mills, 48 iron founderies, 33 machine shops, 12 boiler works, 6 large steel works, 10 brass founderies, 16 potteries, 5 cotton mills, 9 plow works, 10 establishments for heavy forging; also a number of extensive white-lead factories, chemical works, saw, ax, copper and other manufactories of only the great staples of trade, turning out nearly $100,000,000 in value of her own manufactures—making it the largest manufacturing city of the West.

The Foulness of Court Houses.

At a recent meeting of the Manchester Literary and Philosophical Society, a paper was read by the President, R. Angus Smith, Ph. D., F.R.S., etc., "On Air from off the Atlantic, and from some London Law Courts." The specimens of air collected by Mr. Fryer, when on his way to the West Indies, and those collected in Antigua, are worth remarking, as the first agrees with the figures obtained previously when examining air on the shore and open heaths of Scotland, where the highest average was obtained, and the second agrees with the numbers obtained in more inhabited but not closely inhabited places. Those from a law court are interesting; they are the most deficient in oxygen of any specimens found by me during the day in inhabited places above ground. The first is almost exactly the same as the average found in the currents of galleries in metalliferous mines; that from the lantern is nearly the same as the specimens found close to the shafts of the same mines, meaning of course the average of many specimens. I have not known any mills or workshops so deficient in air. I consider a room bad when it loses 1,000, and workshops very bad when they lose 2,000 of oxygen out of a million parts; here the loss is actually 5,000 less than the parks of London. The circumstance is strange, and I hope unusual. A scientific friend happened to call my attention to it and wished me to examine the air. The moisture from the window was collected and there were several ounces obtained, and more might have been easily found. It was perspiration in great part, the smell of it was distinct. It it putrefying, and decolorizes more permananganate now than it did it first.

Mere change of air will not purify a room like this—a current must pass through it for a long time until complete oxidation takes place.

European Pocket Timekeeper.

A correspondent sends us a sample of article bearing the above extended title, which is now being extensively advertised and sold for the *very low* price of $1. The manufacturers state that the patent was applied for June 29, 1865. No patent has been obtained—nor can a patent be obtained—for this device, which consists of a piece of pasteboard, upon which is printed a few figures representing a sun dial, to which is also attached a string pendulum. The whole affair could not cost to exceed two cents; and, so far as its utility is concerned, it would be dear at that price. It appears to us to be a small swindle under a high-sounding title.

ACCORDING to a return just issued by the Minister of Public Works the total length of railways at work throughout France on the 31st December last was 8,473 miles, against 8,158 miles at the close of 1864.

THE thickness of the film of a soap bubble has been ascertained to vary from 1-19,000th to 1-35,000th of an inch.

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THE

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SOLID FLOATING ON MOLTEN IRON.

The facts and principles in regard to this matter are few and simple. Iron, like water, in changing from the liquid to the solid state expands. Solid iron floats on molten iron for the simple reason that a cubic foot of solid iron is lighter than a cubic foot of molten iron. The reason why a pattern must be made larger than the desired casting is, that the iron hardens while it is very hot, and then in cooling it shrinks. Careful experiments have shown that ice also contracts by reduction of temperature.

Iron and water are not the only substances that expand in changing from the liquid to the solid state; it may be a general law applicable to all substances. It has long been known that water, iron, and antimony have this property; and Dr. Rowell, of this city, has observed it in the case of at least six other substances, namely, lead, zinc, tin, resin, wax, and tallow. The expansion of some of these substances is much more than that of others; the expansion of zinc approaches that of iron, while lead expands so very little that unless the temperature of the solid portion is almost as high as that of the melted portion, the solid will sink in the molten mass. This condition may be obtained by filling an iron vessel with molten lead, and after the lead has hardened, placing the vessel over a fire; the lead will, of course, melt first on the outside, and the temperature of the central lump will be at the same time raised nearly as high as that of the melted portion; in these circumstances the solid will float just at the surface of the melted mass.

VELOCITY OF MECHANISM.

Fan blowers are frequently run with a velocity of 3,000 turns per minute, while the usual velocity of cotton spindles is between 6,000 and 7,000 turns per minute. These are the highest rotary velocities with which we are acquainted in ordinary mechanism, but M. Arago, in measuring the difference in the velocity of light while passing through air and through water, wished to give a revolving mirror a velocity of 8,000 rotations per second. This he was unable to do; with the most delicate and perfect arrangement of cog wheels he was able to impart only 1,000 revolutions per second to his mirror. M. Foucault, by substituting for cog wheels a delicate turbine acted on by a steam jet, raised the velocity to 1,500 turns per second. M. Arago by removing the mirror and turning the spindle alone, achieved a velocity even by means of cog wheels, of 8,000 turns per second—equal to 480,000 turns per minute.

That spindle, therefore, turned 80 times while an ordinary cotton spindle is turning once! This is the highest rotary velocity of which we have any account.

BOILER EXPLOSIONS ON WESTERN WATERS.

The boiler explosions on the Western waters seem to occur as frequently as ever, but public indignation is aroused only where tubular boilers are the cause.

The inspectors in New Orleans have given public notice that after certain dates they will condemn all boats having tubular boilers, and a recent paragraph in one of our exchanges, stated that a number of engineers in Louisville, Ky., had left the boats because the proprietors persisted in retaining tubular boilers; as if boilers could be taken out and set ashore like trunks.

If such foolish prejudices are allowed to rule, a new generation would seem to be required; not wise after its own conceit, but skilled in the management of modern steam engines and boilers.

Very little attention seems to have been directed to remedying the evils complained of except by the summary action alluded to, but a great deal of useless denunciation is indulged in. Occasionally, however, we find men with sensible ideas who think, not unreasonably, there are remedies for all diseases, and that tubular boilers can be as well run on Western rivers as in other parts of the world.

Mr. John Schaffer writes a long letter to a St. Louis paper, setting forth the fact that the boilers on Western steamboats are very badly designed. He says the steam room is so small and the point at which the steam pipe leaves the boiler so little above the water, that constant priming takes place, and that he has seen the water pass out of the exhaust pipe in a perfect flood.

We give his own words:—

From my own observation, corroborated by the experience of other engineers of opportunities, the recent explosions were caused by a want of water in the boilers, and that the water was in every instance drawn from the boilers without the knowledge of the engineer on watch at the time of the explosion. I have seen the water in boilers escape through the cylinder of the engine with such velocity as to have emptied the boilers in two or three minutes, if not checked, and this occurs frequently on our high pressure boats, and in my judgment the failure to detect the escape of water in that way, from the boilers through the engine and out at the escape pipe, has caused the late as well as disasters in former years.

The boilers upon our boats are set higher than the cylinder of the engine. The steampipe leading from the boilers to the cylinder is generally somewhat in the form of a siphon, sufficiently so, if once started to draw the water from the boilers, and that the water does frequently so start to flow, every engineer of experience knows to be the case. The main difficulty is to know the exact time and the cause of the water starting to flow out of the boiler through the cylinder and escape pipe. This generally happens when the water is high in the boiler, with a low pressure, or ordinary pressure, of steam The space for steam is occupied by water so as to leave small steam room, not sufficient to supply the cylinder which may be making from 12 to 15 revolutions per minute.

Now the proof of this theory is to be found in the facts that most of the recent explosions as well as those in former years have happened to boats in about one to one and a half of an hour after they had started from some point where the fires had been cleaned out and the water was known to have been full in the boilers. The first boat in which my attention was called to this, as the cause of the explosion, was the steamer *Metropolis*, which exploded one of her boilers on the Ohio river about eleven years ago. The boat was new and on her first trip. The captain, who was on the upper deck, discovered the water going out through the escape pipe, so as to literally flood the deck. He called to the first engineer, who was in bed, to know what was the matter; stated that the water was coming out of the escape pipe. The engineer immediately discovered that water was flowing with the steam through the cylinder and escape pipe. He examined the state of steam and found 120 lbs. Before he could reach the boilers one of them blew up; two or three sheets had given way over the hottest part of the fire. The same happened to the steamer *John J. Roe*, in 1861. The boat had made a landing, and started out with full water in the boilers. Shortly before the accident the water was discovered 'by the' pilot going out of the scape-pipe. The steamer *Princess* blew up in 1860. This boat had started from the landing at Baton Rouge with full water. The engineer stopped the doctor; the water began to fall on deck from the escape-pipe, and in a little time two boilers exploded. The engineer on duty was killed The *St. Nicholas* blew up near Helena about eight years ago. This boat had the water to escape through the engine before the accident, on several occasions, but the engineer had discovered it and shut down the valve at two or three different times! The steamer *Sultana*, which exploded three of her boilers in April last, had left the coal yard above Memphis about one hour before. The engineer lived long enough to state that all the machinery was working well, and that there was sufficient water in the boilers as indicated a few minutes before. The escapement was in the chimneys, and could not, of course, be detected by the escape pipe.

Numerous other instances are cited by Mr. Schaffer, but we have no room for them.

Of the gun boats built at St. Louis in 1861, seven of them had to be altered after they got to Cairo. It was found that owing to the construction of the steam drum and pipes, the water went out through the engines and escape pipes.

It seems incredible to us that such things could be and pass unnoticed, but Mr. Schaffer speaks from experience, and therefore knows.

The remedies are plain, and some very good common-sense alterations are recommended. It is not uncommon for boilers to prime. Even our marine boilers do it, especially those in ships which run in both salt and fresh water; but when we find that such a state of things exists we take means to stop it. We open the doors and close the throttle partially, and if we have a variable cut-off, run it down so as to follow short. We put on all the feed so as to lower the temperature in the boiler, but our engineers do not find it necessary to run away from the boat or the inspectors, to denounce the boilers as dangerous.

"Eternal vigilance is the price of liberty." and it is also the price of safety and economy in the use of steam power.

THE PROPER TEMPERATURE FOR CHURNING BUTTER.

For a few weeks past the Farmers' Club has devoted considerable time to the discussion of butter making, and much difference of opinion was elicited in regard to the proper temperature for churning butter.

It has long been known that the churning of butter is simply a mechanical operation, working no chemical change in the constituents of the cream. The butter exists in the milk, forming 4½ to 5½ per cent of its weight, but each little globule is inclosed in an exceedingly delicate membrane, which prevents the several globules from adhering together. By the process of churning these membranes are worn or broken, thus allowing the several globules to come together in a single mass. At a temperature below about 60° this union will not take place, while at a few degrees higher temperature the casein of the milk will mingle with the butter, giving the butter a white color and the flavor of cheese. The best butter is obtained at the lowest temperature at which the butter will come, and this is variously stated at from 55° to 66°. This difference of opinion may result from difference in the samples of milk tried by different observers, or it may be due to the fact that in some cases the temperature was observed before the churning commenced, and then the temperature was raised several degrees by the churning. It was stated in a recent number of the *Mechanics' Magazine*, that Mr. Rennie raised the temperature of water, by simply churning it, to the boiling point. While engaged in experimenting on the evolution of heat by the agitation of water, he put ten pounds of water into a churn which revolved at the rate of 232 revolutions per minute; the temperature of the water rose to the boiling point, and an egg was boiled hard in it in six minutes.

If the farmers throughout the country would buy thermometers for the purpose, and would always have their cream at 60° to 66° temperature when they churn it, the average quality of our butter would be very greatly improved, and an immense amount of labor in churning would be saved. Thermometers without cases are most suitable for measuring the temperature of liquids, as they may be easily cleaned after immersion.

Great Plan for a Steam Railroad Around New York.

At the last meeting of the Polytechnic Association, Mrs. Wilson read a paper prepared by her husband, Mr. H. B. Wilson, in which elaborate details were given of a plan for a railroad around Manhattan Island, to be sunk in a dry canal 40 feet wide, and deep enough to run the cars beneath bridges at the surface. It was proposed to build the road along the edge of the water, and to have a double track for freight, and another double track for passengers. Mr. Wilson's idea was to have this road in addition to a subterranean road beneath Broadway.

CARELESSNESS is half way between accident and intention.

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ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING MARCH 27, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

53,389.—Hinge.—John W. Allen, Newark, N. J.:

I claim the construction and arrangement of the notched hinge butt, l, latch lever, r, with its knob or handle, u, and the guide or clasp, t, of the swinging leaf when combined and operating as and for the purpose specified.

53,390.—Stopper for Ink Bottles.—Martin Ames, New Ipswich, N. H.:

I claim the fixed catch, B, connected with the collar, a, in combination with the lid or cap, C, provided with an internal flange, c, having a hole, d, in it, or any other equivalent means for the catch, B, to engage with, and also provided with a pressure stopper, e, said lid or cap being connected with the collar, a, by a hinge, b, arranged with a spring, j, to admit of a lateral movement or adjustment of the lid or cap, substantially as and for the purpose set forth.

53,391.—Door Spring.—B. F. Barker, San Francisco, Cal.:

I claim the combination of the spiral spring, C, pivoted arm, E, bracket, F, groove, b, and recess c, when constructed, arranged and employed in the manner and for the purposes specified.

53,392.—Vegetable Cutter.—C. F. A. Bander, Newark, N. J.:

I claim a vegetable cutter made of a piece of sheet metal, A, which is slotted so as to form a series of strips, b, with double cutting edges, substantially in the manner herein set forth.

53,393.—Head Block for Saw Mills.—D. C. Baughman, Fort Seneca, Ohio:

I claim the application to the shaft, D, of a ratchet gage wheel, K, having upon its circumference two sets of teeth varying in number, in combination with the lever, G, and reversible pawl, j, substantially as described.

53,394.—Fence Gate.—Julius S. Benedict, Bedford, Ohio:

I claim the strip, B', hinge or center pin, E, and roller, b, in combination with the gate when arranged in the manner and for the purposes set forth.

53,395.—Filter.—Benjamin Best, Dayton, Ohio:

I claim the combination of the sand box, D, and filtering box, C, provided with sponge tubes, a and c, with the vessels, A and B, substantially as described.

53,396.—Valve for Pumps.—Henry P. M. Birkinbine, Philadelphia, Pa.:

First, I claim the valves and valve seats of a pump so constructed as to form a water cushion, substantially in the manner and for the purpose set forth.

Second, The combination of the double-faced valve, F F', with the valve, G, having cups for forming a water cushion, the whole being constructed and arranged substantially as and for the purposes set forth.

Third, The arrangement of the valve, G, seats, F, stems, H H', H'', and yoke, I, all constructed and combined, substantially as and for the purpose set forth.

53,397.—Protracting Bevel.—W. W. Branch Jr., Madison, Ohio:

I claim the combination of the protractor, a, margin edges, b b, extension blades, C, stock, D, and index, E, arranged and operating in the manner and for the purpose herein specified.

53,398.—Hand Loom.—James L. Branson, Cincinnati, Ohio,

First, I claim the combination of sleeve, H, provided with the inclines or cams on its end, ratchet wheel, i, pinion, G, and wheel, C', provided with the pawl, h, arranged to operate as and for the purpose set forth.

Second, The sleeve, H, provided with the cams on its end as described, in combination with the sliding rod, K, and cam, I, arranged to operate substantially as herein shown and described.

Third, The cam, I, constructed as shown and described, and arranged to move laterally on the shaft, C, in combination with the treadles, k, whereby one cam is made to operate all the treadles, and also to keep the treadle depressed during nearly the entire revolution of the cam, as and for the purpose set forth.

Fourth, I claim the combination and arrangement of shaft, n, provided with the crank, c, and wheel, b, with a shaft, d, provided with the wheels b' and e, when arranged to operate in connection with wheel, f, on the shaft, C, as shown and described for the purpose of enabling the attendant to stand facing her work.

53,399.—Steam Generator.—Geo. B. Brayton, Boston, Mass.:

I claim a steam generating apparatus composed of compartments constructed and arranged substantially as described.

And I also claim the use of a vessel for the generation of steam made with openings, a a a, and partitions surrounding the same, substantially as described for the purpose specified.

53,400.—Machine for Boring Hubs.—D. C. Breed, Lyndonville, N. Y.:

I claim the combination and arrangement of the annular plate, L, adjustable connecting plates, n n, supporting arms, J J', and adjusting screws, M N, in connection with the spiral grooved chuck plate, K, and cog bars, m m, substantially as herein specified, whereby the centralizing longitudinal and annular adjustments of the hub are effected together, as set forth

I also claim the combination of the adjustment of the cross bar, H, by the longitudinal scale, x, and the transfer adjustment of the mandrel bearing, I, by the scale, i, with the adjustment of the chuck plates, K L, to suit hubs of different length, for the purpose of directly determining the required taper of the hole to be bored in the hubs, substantially as herein described.

53,401.—Machine for Ironing Hats.—William Best, Newark, N. J.:

I claim, First, The vertically sliding frame, D, carrying the smoothing irons, E F G, the said smoothing irons having a sliding movement with regard to the said frame and being arranged with reference to a rotary hat block, substantially as herein set forth for the purpose specified.

Second, The many sided smoothing irons arranged in relation with a rotating hat block, substantially as set forth for the purpose specified

Third, The inverted conical or taper blocks, H, acting upon the bars, n'', and sliding blocks, n, to spread apart the smoothing irons, substantially as set forth.

Fourth, The sliding blocks, n, and the bars, n', arranged with reference to the partitions, m'', with their oblong vertical holes in such a way as to allow the smoothing irons a limited rocking movement, substantially as herein set forth for the purpose specified

Fifth, The arrangement of the staples, v', and slide, v, for securing the hat block upon the table, substantially as herein set forth.

Sixth, The catch, b, belt slipper, d'', and table, B, arranged with reference to each other and to the hat block and smoothing irons, substantially as set forth for the purpose specified.

Seventh, The clamp composed of two halves, q, sliding in the base, t, and operated by a screw, t', when provided with a flange, m3, and used in connection with a rotating table and suitable smoothing irons, substantially as herein set forth for the purpose specified.

Eighth, The annular plate, m4, placed upon the flange, m3, of the clamp underneath the hat brim, when used in connection with suitable smoothing irons, substantially as herein set forth for the purpose specified

Ninth, The elliptical plate or guide, S3, secured upon the hat block and guiding the iron, F, when smoothing the underside of the brim, substantially as herein set forth.

Tenth, The horizontal bars, m, adjustable in the lower ends of vertical bars, m', arranged in relation to smoothing irons, substantially as herein set forth for the purpose specified.

Eleventh, The arrangement of the luting cloth on the end of an elastic bar or spring attached to the same shaft as one of the smoothing irons, substantially as set forth for the purpose specified.

53,402.—Wooden Pin Machine.—Nelson W. Brewer, Williamsport, Pa.:

I claim, First, In combination with the stationary cutters, the vertically reciprocating block carrier for cutting off the pins from the wood and holding them ready for being pointed, substantially as herein described.

I also claim in combination with the stationary cutters and reciprocating pointing tools, the traveling followers, for forcing the pins against the pointing tools, substantially as and for the purpose described.

I also claim in combination with the stationary cutters, and reciprocating block carrier and followers, the vibrating guide board, which is moved aside by the followers as they are approaching the cutters, and returns after the followers are withdrawn to receive the finished pins and carry them out of the machine, substantially as described.

53,403.—Wick Trimmer.—William B. Brooks, Boston, Mass.:

I claim the combination of the frame, a b, lever, c g, spring, o, and knife, h, when said knife is attached directly to the lever and all arranged to operate as and for the purposes herein specified.

53,404.—Burner for Gas Stoves.—T. H. Brymer, New York City.:

I claim the box, B, perforated at its sides as shown at b, and provided with the vertical tubes, C, in combination with the button or deflector, D, air opening, a*, in the top of the box, B, and the tube, A, with or without the perforated disk, G, all arranged substantially as and for the purpose herein set forth.

53,405.—Lathe Chuck.—James A. Bunce, East Berlin, Conn.:

I claim the combination of the sliding bars, C, with the jaws, B sheath, D, and stock, A, substantially in the manner as and for the purpose described.

53,406.—Ventilator for Hats.—Benajah J. Burnett, Mount Vernon, N. Y.:

I claim, First, A hat provided with a ventilator consisting of the series of air deflecting and conducting passages, a' g, arranged with reference to each other, and projecting outwardly from and inwardly through the crown of the hat, substantially as set forth for the purpose specified.

Second, The ventilator consisting of plates, a m h, and flanges d' b', united by a screw e, whereby they are secured in the hat, substantially as herein specified.

53,407.—Method of Treating Cholera.—Alexander Collins Campbell, Mount Morris, N. Y.:

I claim, First, The preventive medicine composed of the several ingredients, and in substantially the proportions as described, under the head of the first part of my method of treatment.

Second, I claim the same compound with the addition of laudanum, tincture of cayenne pepper, and pepperine, in substantially the proportions described, as a remedy in the diarrhœal stages of cholera, as set forth.

Third, I also claim the external application, composed of unguentum hydrargyrum and iodine, in combination with the internal remedies above named, in the diarrhœal stage of cholera, as described.

Fourth, I claim injecting oxygen gas into the tissues of the body, through perforations made in the skin, for the purpose of vitalizing the sub-oxydized blood in the capillary vessels and small arteries and veins and producing warmth of the surface, substantially as described.

Fifth, I claim injecting oxygen gas into the tissues of the body in combination with the injection of artificial serum into the veins, for restoring the fluidity to the blood, and arterializing it in the small vessels remote from the heart and lungs, substantially as and for the purposes set forth.

Sixth, I claim as a whole, the within described method of treating cholera, substantially as set forth.

53,408.—Cultivator.—James Canfield, Washington, Iowa, and Charles Hess, Lyons, Iowa.:

First, We claim the combination and arrangement of the inner beams, F F, the slotted hangers, H H, pivoted to the cross bar, C, and the regulating bar, I operating as and for the purposes specified.

Second, We claim the combination and arrangement of the plow beams, E F, the hangers, G H, the levers, L L, cross bar, C, chains, a b, arranged and operating as and for the purposes described.

53,409.—Harvester.—J. M. Canfield, A. T. Still and E. P. Wheeler, Lawrence, Kansas.

We claim the arrangement of the grain receptacle, D, the handle, E, and standard, F, when constructed and operated substantially as and for the purposes specified and shown.

53,410.—Balance Valve for Steam Engines.—John W. Carhart, Troy, N. Y.:

I claim, First, The recess, i, in their end of the plug valve, A, constructed and operating substantially as and for the purpose described.

Second, The arrangement of the screw, m, yoke, n, set screw, r, and cross bar, q, with the plug valve, A, and shell, B, constructed and operating substantially as and for the purpose set forth.

53,411.—Water Drawer.—H. P. Castle, Ashtabula, Ohio:

I claim the clamp, E, provided with an arm, H, and lug, I, in combination with the shaft, B, and forked crank, constructed and arranged as and for the purpose set forth.

53,412.—Window Blind.—L. W. Chase, Galion, Ohio:

I claim the arrangement of the handle, l, single strip, G, and crank arms, h, in combination with the slats, b, and tenons, c, operating in the manner and for the purpose herein specified.

I also claim the combination of the latch, m, and strip, g, in the manner and for the purpose herein specified.

53,413.—Apparatus for Crimping Hair.—H. Christian, New York City:

I claim a crimping apparatus adapted for use in connection with hot water as a medium of supplying heat to the surface or surfaces brought into contact with the hair, substantially as hereinbefore set forth.

53,414.—Skate.—Hiram Clark, Jordan, N. Y.:

I claim the post, p, having a stud, d, at the top to enter the foot plate, B, and an opening at the bottom in combination with diagonal brace bars, b, which are secured to the foot plate by screw or otherwise, substantially as and for the purpose set forth.

53,415.—Floor Attachment for Furniture.—Harrison Cole, Cincinnati, Ohio:

I claim the furniture floor fastening, consisting of the dovetailed tenons, C C', and rockets, E E', having one or more binding or locking tongues, F, substantially as herein set forth.

53,416.—Straw Cutter.—Munson Cole, Colebrook, Conn.:

I claim the V, or concave bottom of the receiving box and my method of arranging the operating parts of the straw cutting machine, as herein set forth.

53,417.—Apparatus for Receiving and Delivering Mail Bags.—John J. Cooper, Olmsted Ohio.:

First, I claim the arms, A', pivoted to the frame, A, in combination with the catch, B', and spring, c'', in the manner and for the purpose substantially as set forth.

Second, The arms, A', and hanger, C, in combination with the springs, c and b, substantially as and for the purpose described.

53,418.—Fence.—Elias Cozad, East Cleveland, Ohio:

I claim the arrangement of wires or rods, C, with the spiral turns, B', in combination with the pots, A, slots, a, and keys, c, in the manner and for the purpose set forth.

53,419.—Carriage Curtain Fastener.—Elmer Crawford and James H. Birch, Burlington, N. J.:

We claim the binding of the eyelets of carriage window curtains by means of metallic plates riveted together, held fast to the frame by hooking on revolving knob screws applied to and in combination with carriage window curtains, in the manner and for the purpose above set forth, using, to obtain the said effect, any metal, as brass, silver, galvanized iron, or any suitable material substantially equivalent or which will produce the intended effect.

53,420.—Instrument for Measuring Distances.—John J. Daly, New Orleans, La.:

I claim the arrangement of the scale, A, index, B, thumb screw, D, and clamp screw, E, in combination with the rod, F, and eye piece, G.

53,421.—Boiler for Culinary Purposes.—F. W. Dembois, East Saginaw, Mich.:

I claim the combination with any vessel suitable for containing liquid to be boiled, of a cover, B, consisting of the parts substantially as herein described.

53,422.—Adjuster for Evaporators.—J. A. DeTar, Lanesfield, Kansas:

I claim the frame, or its equivalent, with an adjusting screw depending therefrom and attached to the end of the rocker pan, substantially as and for the purpose described.

53,423.—Roller Temple for Looms.—Warren W. Dutcher, Milford, Mass.:

I claim my improved application or arrangement of the headed spindle and its fastening screw, with reference to the cap extension and the standards, E, for supporting the cap, C, the spindle under such application being screwed into one, and being free to move lengthwise in the other of such parts at E, while the fastening screw is in the act of being set up, the whole being so that there may be no such force exerted by the spindle on the extension of the cap as will operate to draw the cap and spindle out of parallelism with the trough.

53,424.—Gang Plow.—John H. Eckert, Lebanon, Ill.:

First, I claim the arrangement of the plow beams, E E, lever, M, adjustable bars, G*, adjustable guide, H, rod, F, screw rods, G G, in combination with the standards, J, rods, K, sockets, f, plows, I, and braces, L, constructed and operating in the manner and for the purpose herein specified.

Second, The combination of the lever, N, cross bar, o, notched plate, p, and frame, C, constructed and arranged to operate in the manner and for the purpose herein specified,

53,425.—Sheep Shearing Table.—W. R. Elder and O. T. Baker, Huntington, Ohio:

I claim the arrangement of the braces, C' C', and D' D', in combination with the adjustable pivoted legs, A B, straps, c, and elastic holder, D, constructed in the manner and for the purpose substantially as set forth.

53,426.—Telegraph Insulator.—Alfred B. Ely, Newton, Mass.:

I claim the rubber belt and disk, attached to the shank, in combination with the pin hook, when constructed and arranged substantially as described.

I also claim as articles of manufacture the rubber belt chambered pin hooks as described.

53,427.—Telegraph Insulators.—A. B. Ely, Newton, Mass.:

I claim as an article of manufacture, the rubber screw covered pin hook with rubber disk attached, as described,

53,428.—Cravat.—Otto Ernst, New York City. Antedated March 23, 1866:

First, I claim a sheet metal frame for a cravat, formed with an opening or openings for attaching the bow at the front portion and retaining it in place, as specified.

Second, I claim a loop or fastening on the inside of the sheet metal frame of the cravat at the front part thereof, to connect the same to the shirt collar, as specified.

Third, I claim forming the sheet metal for the cravat frame with a curved edge at the part which comes below the chin, as and for the purpose specified.

Fourth, I claim a cravat frame enameled, or coated with a color to imitate a woven fabric on those portions of the frame that are visible when in use, as set forth.

53,429.—Egg Beater.—Henry D. Felthouse and John H. Felthouse, Philadelphia, Pa.:

I claim constructing a series of beaters, c, substantially as described, and combining them with a closed vessel, A, so that the eggs shall be cut up, shaking the vessel back and forth, the apparatus being constructed and operating substantially in the manner hereinbefore described and for the purposes specified.

53,430.—Telegraph Cable.—Samuel T. Field, St. Louis, Mo.:

First, I claim an elastic cable cord, A, conducting medium or wires, C, substantially as described and for the purposes set forth.

Second, The elastic cable composed of parts, A and B, combined with the non-conducting and yielding cover, D.

53,431.—Artificial Fuel.—Randall Fish, Washington, D. C.:

I claim a composition of matter for use as a fuel, compounded and prepared substantially in the manner set forth, from the ingredients named or their equivalents.

53,432.—Churn.—D. A. Fiske, Delavan, Wis.:

I claim a churn dash provided with hinged or jointed flaps when the same are hung as shown, so as to have an inclined position when closed against the frame of the dash, and one flap having a reverse inclined position to that of the other, substantially as and for the purpose set forth.

I also claim the chamber, H, applied to the under side of the lid or cover of the churn, substantially as and for the purpose set forth.

53,433.—Scraper and Knife and Fork Cleaner.—Nathaniel W. Foye, Cambridge, Mass.:

I claim the within described implement, consisting of a scraper having one or more flexible edges, combined with a knife and fork cleaner, operating substantially as described.

53,434.—Balance Beam for Boring Oil Wells.—John Bodine Frazier and Homer Wickes, Conneantville, Pa.:

We claim the weight box, E F, with the straps, G, key, H, and rollers, 1 and 2, in combination with the beam, B C, constructed as described, and for the purposes set forth.

53,435.—Amalgamator.—Henry A. Gaston, Austin, Nevada:

First, I claim the rotating screw, C, operating within a cylinder or case, D, situated within the amalgamating pan, B, substantially as herein described for the purpose specified.

Second, The inclined partitions, n, arranged between the case, D, and the amalgamating pan, B, and with reference to the openings, S, substantially as herein set forth for the purpose specified.

53,436.—Whiffletree.—Arrington Gibson, Riverfalls, and William M. Newcomb, Clifton, Wis.:

We claim the bands, P, with the lips, C, bent lever, D, in combination with the pin, H, spring, f, or its equivalent rod, K, and strap, N, constructed substantially as and for the purpose specified

53,437.—Crate for Carrying Fruit.—William Gilbert, Catskill, N. Y.:

I claim the combination of front, rear, end, and bottom frames, formed and arranged as described, with a solid or frame work top or lid, to form crates, for the holding and carrying of fruits or vegetables or similar articles, in the manner as set forth in the within specification.

53,438.—Evaporator.—L. R. Gleason.—Dundee, N. Y.:

First, I claim the channeling of tables, which allows of using broad tables.

Second, The use of faucets to feed the brine upon the first table, and to regulate the feeding according to the condition of the atmosphere.

Third, The depending points in combination with projecting

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ends of tables for directing the drip from one table to another correctly.

Fourth, The movable pins or their equivalent for the purpose specified.

53,439.—Garden Roller for Destroying Insects.—Harman Gray, Sugar Creek, Wis.:

I claim the guide wheel, A', scraper, B, and ridged roller, C, all constructed and arranged to operate substantially as described.

53,440.—Furnace for Treating Auriferous Ores.—Amos E. Griffiths, Philadelphia, Pa.

First, I claim the arrangement of a cupola immediately over a water cistern for the treatment of metal bearing minerals, substantially as set forth.

Second, In combination with a cupola, C, and chimney, F, I claim the reversed pipe, D2 and suction fan, E, substantially as set forth.

Third, I claim passing the fumes from heated metallic ores on mineral bearing metals, over wet blankets or other porous substances, for the purpose of condensing such fumes and depositing the metals suspended in them.

Fourth, I claim the arrangement of the chimney, F, pipe, G, branch pipes, G1 G2 G3 G4, with the sluice boxes, L and H, substantially as set forth.

53,441.—Rack and Stove Shelf.—John Gulliford, Girard, Pa.:

I claim the rack frame, H, brackets, B F, in combination with the shelves, H F, and pipe, A, arranged as and for the purpose substantially as set forth.

53,442.—Valve Gear for Steam Hammers.—Hugh Hamilton, Newburgh, N. Y.:

I claim the arrangement of levers, L and N, in combination with link, K, and ram, a, for one, and with rod, u u, lever, W, and the slide valve for the other lever, which enables the blacksmith to work single acting and double acting steam hammers in the easiest possible manner, as described.

53,443.—Gang Plow.—A. Hammond, Jacksonville, Ill.:

I claim, First, Providing for adjsuting the two supporting wheels, A and F, simultaneously, by means of a rack and screw, or their equivalents, substantially as described

Second, Connecting the landside wheel, F, to a spring or yielding lever, G, substantially as described.

Third, Connecting the rear supporting wheel, J, to a spring or yielding lever. H, substantially as described.

Fourth, Providing for adjusting the spring, v', of the lever, H, substantially as described.

Fifth, Pivoting the axle bars of the rear supporting wheels, F, and J, to oscillating segments, substantially as described.

53,444.—Process of Reducing Refractory Gold, Silver, and Copper Ores.—Charles W. Harvey, Buffalo, N. Y.:

I claim the reduction of refractory gold, silver, and copper ores, in common blast furnaces to the degree of obtaining pigs or bars of white metal therefrom, by combining and smelting therewith, either the carbonate of lime, soda, muriate of soda, or other alkali or slag, substantially as described.

53,445.—Cultivator.—Paul Hildreth, Beloit, Wis.:

I claim the adjustable cultivator bars, F F, the bed pieces, H H, the adjustable brackets, w w, the movable gages, e e, and the scrapers, q q, when constructed substantially as herein set forth and described, for the purposes specified.

53,446.—Cultivator.—Charles Holman, Cameron, Ill.:

I claim the buttons, H' H', secured to the upper ends of the rods, G G, in combination with the bar, J, provided with the recesses, h h, and the springs, g, on the rods, G, all arranged substantially as and for the purpose specified.

53,447.—Cotton Picker.—George A. Howe, Brooklyn, N. Y.:

I claim the arrangement of stripper fans in respect to the shaft on which they revolve, as tangents thereto, substantially as described.

53,448.—Centrifugal Machine.—Harvey Hunt, Oskaloosa, Iowa:

I claim the construction of a centrifugal sugar separating screen, with a conical floor or deflector, substantially as and for the purpose set forth.

53,449.—Flyer for Spinning Machinery.—Charles Hyde, North Chelmsford, Mass.:

I claim as my invention the combination of the projection, B, socketed at the ends, with the flyer, A, and the wire or guard, C, applied so as to extend either above or below, or both above and below the projection, as specified.

I also claim the socketed projection as made with a groove, f, going either wholly or partially around it, substantially as and for the purpose hereinbefore set forth.

53,450.—Harvester Rake.—J. Herva Jones, Rockford, Ill.:

I claim, First, The combination of the turning and oscillating rake post, with the cam groove located upon the grain side of the main frame, when constructed, arranged and operating substantially in the manner described for the purposes set forth.

Second, The combination of the platform, the divider, and the wing board with the rake, substantially as and for the purpose described.

Third, The arrangement of the platform, the driving shaft, and the rake, substantially for the purpose set forth.

Fourth, The combination of the driving shaft, the swiveling socket, the cam groove, and the rake, when arranged for joint operation, substantially as described.

Fifth, The combination of a rake-post with a swiveling socket and a sliding fulcrum, substantially as and for the purpose described.

Sixth, The combination of the driving shaft, the swiveling socket, and the hemispherical cam groove, arranged and operating as described.

Seventh, The combination of the rake post, fulcrum pin, and guide socket, as and for the purpose described.

Eighth, Uniting the rake post and arm when located as described at an acute angle, substantially as described for the purpose set forth.

53,451.—Portable Tank for Oil, Etc.—Joel F. Keeler, Pittsburg, Pa.:

I claim, First, The hatchway, h h, in combination with the steam pipe, d, or their equivalents, in the construction and use of portable tanks.

Second, The hollow cover, f, constructed and used substantially in the manner and for the purpose described.

53,452.—Broom Head.—Abraham B. King, Seven Mile, Ohio:

I claim, First, A broom head composed of a wooden abutment, C, and one or more wooden clamps, D and E, all arranged and operating substantially as described.

Second, The flange plates, H n h', and I i i', or their equivalents, in combination with the clamps, D E, as set forth.

53,453.—Sawing Machine.—Joseph Kunz, Bay City, Mich.:

I claim the arrangement of the saw, c, adjustable pivoted to the swinging weighted frame, g, which vibrates upon pivots in the supporting frame, m n, substantially as described and represented.

53,454.—Match Compound.—Louis Lanszweert, San Francisco, Cal.:

I claim the within-described match compound made of the ingredients above set forth, free from phosphorus and sulphur, substantially as specified.

53,455.—Paper Shirt Bosom.—Charles M. Lee, Springfield, Mass.:

I claim the button-hole strip or loop, e, when attached to the upper edge of the bosom by the continuous ornamental stitching upon the outer edges of the imitation plaits, substantially as and for the purpose set forth.

53,456.—Heating Shade for Gas Burners and Lamps.—Augustus H. Lochman, York, Pa.:

I claim the combination of a fixed or adjustable heater, B, with a gas or lamp shade, A, substantially as described.

I also claim the construction of the hollow heater, B B a C, substantially as and for the purpose set forth.

53,457.—Sulkey Plow.—Samuel M. Lockwood, Chicago, Ill.:

I claim the arrangement substantially as described of the part, P, or its equivalent in construction with the pole, A, and the clamp, D, or its equivalent, substantially as above described, by means of which a change of direction is obtained, substantially as set forth.

Second, The arrangement of the braces, R and R, in manner substantially as set forth with the corn plows or their equivalent, so that the same can be pointed as one may desire, in order to plow deeper or otherwise, as one may wish.

Third, The method of raising and lowering the plows by the arrangement of the levers, J and J', in connection with the braces, E and G, running from cross bar to cross bar, as above described, or their equivalent, substantially as above set forth, with the seat, k, and in connection with the axle, L, substantially as described, the cross bar, C, with the arms, I and I, or their equivalent, in connection with the shanks m and M, substantially as set forth, and the cross piece, H, or its equivalent, substantially as set forth.

Fourth, The arrangement of corn plows in any and all of the ways substantially as set forth, in combination with a frame work with wheels, and constructed substantially as set forth.

53,458.—Wind Mill.—Philipp Loffler, Milwaukee, Wis.:

I claim the guide rod, a, having the stop pins, o o, and operated by the lever arm, l, constructed and operated as described and arranged in relation to the arms and paddles, substantially as set forth

53,459.—Corn Planter.—David and D. F. Luse, Spring Mill, Pa.:

First, We claim the ball, L, provided with the attaching and adjusting flanch, t, and angle adjusting rod, M, for mounting the drill tooth upon, substantially as and for the purposes herein specified.

Second, We also claim the double share and double mold board furrow clearing plow, N, in combination with the drill tooth, I, substantially as and for the purposes herein set forth.

53,460.—Composition for Core Powder.—William B. Lupton, Pittsburg, Pa.:

I claim a compound made of the ingredients herein specified, to be used in combination with sand in the process of forming sand cores, as set forth.

53,461.—Collapsible Float for Boats.—J. MacDonough, New York City:

I claim the combination and arrangement of the collapsible covering, F, hoops, A A, guard rope, C, and valve, D G, constructed and operating in the manner as herein described.

Second, I claim the combination of the adjustable reversible brackets, m, studs, a, and floats, F, arranged and operating as herein described.

Third, I claim the combination of the collapsible floats, F, hoops, a, guard rope, C, valve box, D G, adjustable brackets, m, studs, a, string pieces, B B, constructed and arranged relatively to each other and the boat, p, in the manner and for the purpose herein specified.

Fourth, I claim the string piece, B B, in combination with the hoops, A A, and flexible covering, F F, substantially in the manner and for the purpose specified.

53,462.—Men's Collars.—D. Mackay, U. S. Army:

I claim a cemented covering adapted for application to the frame of a collar or analogous article of wearing apparel, substantially as set forth.

53,463.—Centrifugal Machine.—Alexander Mackey, New York City, and Eberhardt Miller, Williamsburg, N. Y.:

First, We claim the inner cylinder, m, applied to the main cylinder of a centrifugal machine, substantially as set forth for the purpose specified.

Second, The circular platform, S, and lid, R, arranged with reference to the partition, m, substantially as set forth for the purpose specified.

53,464.—Machine for Raking and Loading Hay.—W. L. Mayfield, Ashley, Ill.:

I claim the manner of giving the up and down motion to the teeth of the rake, H, to wit: by means of the pendent rod, I, notched pivoted plates, K K', the projection, o, and pin, p, all arranged substantially as set forth.

53,465.—Manufacture of Dressing Rolls.—Charles McBurney, Roxbury, Mass.:

I claim the covering of metal rolls with a semi-elastic vulcanized rubber compound for dresser rolls and for similar purposes, as set forth.

I also claim as a new article of manufacture, rolls for dressing yarn and other like purposes, composed of a metal shaft or roll covered with a semi-elastic vulcanized compound having the properties requisite to operate as hereinbefore set forth.

53,466.—Planing Machine.—Wm. B. McIver, Worcester, Mass.:

First, I claim the combination with the feed rolls of a planing machine or machine for working lumber of the bevel gearing, F V H U, and sliding shaft, G, substantially as and for the purposes described,

Second, The combination with the feed rolls in a planing machine of mechanism for operating both rolls upon their axes, and for elevating and lowering the top feed roll, substantially as herein described.

Third, Supporting the gear end of the feed roll, and the upper end of the vertical shaft, in the same stand or bearing piece, substantially in the manner and for the purposes stated.

Fourth, Supporting the upper end of the vertical shaft as described, in combination with giving its lower end play, as and for the purposes set forth.

53,467.—Pump.—Jacob Michel, Rochester, N. Y.:

I claim the combination and arangement of the valve seat, D, made to adjust lower or higher to give greater or less play to the valve, the valve, E, provided with the flange, l, and water-packing grooves, m m, and the piston rim, C, made in a single piece, the whole operating substantially as and for the purposes herein set forth.

53,468.—Table Napkin.—Albert L. Munson, New Haven, Conn.:

First, I claim a paper and cloth napkin, substantially as described.

Second, A paper and cloth napkin when embossed or printed or perforated, substantially as described.

53,469.—Steam Water Elevator.—David Myers and L. H. Noble, Chicago, Ill.:

First, We claim the combination of the reservoir, A, the induction and eduction pipes, C and D, and steam pipe, E, provided with the valves, c b a, respectively arranged and operating substantially as and for the purpose specified.

Second, We claim in combination with said reservoir, A, and pipes, C D E, the shaft, G and J, and lever, I, for the purpose of opening and closing the valves, a b, simultaneously, for the purposes described.

53,470.—Hay Loader.—Oliver F. Nanny, Mamarkaten, N. Y.:

I claim the tubular post, B, with its rings, E E, in combination with the crane, D, the hay fork, G, and bifurcated spring catch, P, for the purposes described.

53,471.—Button.—Frederick I. Palmer, Springfield, Mass.:

I claim the combination of the stud, B, notched as described, with the spring, C, and the other parts of the button, substantially as herein set forth,

53,472.—Fastening for Garments.—Frederick Ingersoll Palmer, Springfield, Mass.:

I claim the attachment of fastening composed of the springs and the pin or studs, substantially as herein shown and described.

53,473.—Combined Pistol and Pocket Knife.—A. J. Peavey, South Montville, Maine.:

First, I claim so hanging the barrel of a pistol within the casing or handle of a pocket knife that its breech end can swing out of it or into the same, substantially as described and for the purpose specified.

Second, The combination of the hook end or arm, G, of the pistol barrel with the spring catch, F, of the breech piece, O, of the knife handle arranged, together and operating as and for the purpose described.

53,474.—Seat Desk for Schools.—Isaac Newton Pierce, Philadelphia, Pa.:

I claim the application of a crane movement by which a chair may be attached to its own desk and yet have a free movement, as substantially set forth.

53,475.—Beehive.—T. W. Pierce, Minneapolis, Minn.:

I claim a beehive constructed of corn cobs, substantially as shown and described.

53,476.—Manufacture of Sheet Iron.—Charles H. Perkins, Providence, R. I.:

I claim preparing plates of sheet iron, whether for receiving a coating of zinc or other metal preparatory for polishing and coloring in imitation of Russia iron, by the application of the decarbonizing process, substantially as described.

And I also claim preparing plates of sheet iron for coloring in imitation of Russia iron by first decarbonizing them and then rolling them, substantially as described.

53,477.—Box for Propagating Plants and Vines.—F. L. Perry, Canandaigua, N. Y.:

I claim a box for the propagation of plants or cuttings, constructed with movable or detachable sides and partitions, substantially in the manner herein set forth.

53,478.—Pole and Thill for Carriages, Etc.—John G. Perry, Kingston, R. I.:

First, I claim the convertible pole and thills, k k, in combination with the adjustable cross plates, a b, constructed as herein described and for the purpose set forth.

Second I claim in combination with the foregoing the use of the projections, i i, to connect the pole and thills to the machines and carriages, substantially as herein described.

53,479.—Railroad Rail.—D. C. Pierce, Clayton, N. Y.:

I claim the combination of the upper or cap rail with lateral flanges, the in erposed elastic material and the lower continuous bearing rail supported upon the road bed either immediately or by intervening chairs or sleepers.

53,480.—Hub or Spool for Curtain Rollers.—Frederick Pilling, Washington, D. C.:

I claim a cup or hub for the rollers of window shades, curtains, or other similar purposes cast in one piece, and comprising within itself a flange, pulley, journal and screw for securing it to the roller, substantially as described.

53,481.—Apparatus for Carbureting Air.—E. A. Pond and M. S. Richardson, Rutland, Vt.:

First, We claim the improved gas machine substantially as herein described, the same consisting of one or more coils of pipes so combined with a fluid vessel and air-forcing apparatus that the said coil or coils shall be constantly supplied with fluid by the action of the blast and hydrostatic pressure, and a continuous circulation of fluid maintained therein as set forth.

Second, The arrangement of the coil in relation to the fluid reservoir so that the air shall be discharged from the coil above the level of the fluid in the reservoir, substantially as herein shown and described.

Third, The arrangement of the air supply pipes relatively to the coil and the fluid reservoir, substantially as herein shown and described, so that the current of air shall be impelled upwardly and along the tubular coil, as set forth.

Fourth, The method herein described of combining the air supply pipe with vaporizing coil by inserting the contracted end of the former into the larger tube of the latter for operation as an injector, substantially as set forth.

Fifth, The employment in connection with a communicating pipe or coil extension under the bottom of the fluid, of a stopper or bamboo or other porous material, as and for the purposes set forth.

Sixth, The use in combination with a fluid vessel and a coil of a perforated diaphragm or dome for returning the fluid ejected from the coil in spray-like form to the reservoir, and thus fill the gas collecting chamber with hydrocarbon vapor, as set forth.

53,482.—Gas Apparatus.—E. A. Pond and M. S. Richardson, Rutland, Vt.:

First, We claim in combination with an apparatus for charging atmospheric air with the vapor of hydro-carbon fluid, the method of utilizing steam from available sources, substantially as is herein described for forcing the air through hydro-carbon liquid or vapor.

Second, The construction of the air pipe with branches, and providing the same with stop cocks so as to supply the vaporizer with hot or cold air at pleasure substantially as set forth.

Third, Generating illuminating gas by means of an apparatus consisting of the combination with a vaporizer of an air pump driven by a gas engine which receives its supply of gas from the gas generator, substantially as herein described.

53,483.—Gaiter Shoe.—Amaziah M. Preble, Lynn Mass.:

I claim the fly as made with the elastic gore arranged in it, as described.

I also claim the combination and arrangement of the ply and its buttons with the instep opening, or the same and its lacing and lacing holes, the whole being substantially as hereinbefore described.

53,484.—Churn Attachment.—William M. Pyle, Greensburgh, Ind.:

I claim the combination with the gearing, J K, crank, p, crank wheel, L, frame, g, h, and dasher shaft, f, of the detachable supplementary lid or cover, C, hooks, D, and pins, e, substantially as and for the purpose specified.

53,485.—Boring Machine.—Emmett Quinn, Washington, D. C.:

I claim the employment in a machine for boring wooden tubes of one or more pipes conveying water to the cutters, whereby the chips made by the cutters are discharged from the machine by the force of the water when constructed and operating substantially as described.

53,486.—Tool for Turning Wood.—Emmett Quinn, Washington, D. C.:

I claim a hollow cutter stock and its cutter, when constructed as described, in combination with a hollow tube supporting said cutter stock, and a discharge pipe, arranged to operate substantially as described and for the purposes set forth.

53,487.—Churn.—L. B. Randall, West Glover, Vt.:

I claim hinging or pivoting the frame or upright, D, which supports the gearing for operating the churn in such a manner that it may be folded, substantially as specified.

I also claim the rack, L, in combination with the bar, K, and hinged upright, D, substantially as specified.

53,488.—Urinal.—Andrew Rankin, New York City:

I claim a urinal in which a deodorizing agent is applied around an eduction tube arranged in relation to the vessel, as herein shown and described.

53,489.—Mop Wringer.—Foster Rhines, Watertown, N. Y.:

I claim the combination of the roller, C, with fixed bearings, the roller, D, applied to the arms, b b, of the treadle, G, the spring or springs, E E, and the pail, A, substantially as described.

53,490.—Metallic Cartridge for Loose Ammunition.—W. H. Risley, Berlin, Conn.:

I claim the cylinder, A, made substantially as described, with a fixed partition to divide it into a shot or ball and a powder chamber, being of a diameter about equal to the bore of the gun with which it is to be used so that the wad can be used to shut the chambers, and with means for removing the wad at pleasure, substantially as described.

53,491.—Plow Point.—Cyrus W. Saladee and Thomas Simpson, Newark, Ohio:

First, We claim imbedding the point, A1, in the top surface of the share, B, in the manner and for the purpose substantially as shown and described.

Second, We claim the stud, C1, figure 3, or its equivalent, in combination with the point, A A1, indentation, F, and slot, H, as and for the purpose substantially as set forth.

Third, We claim the beveled lips, E, of the point, A, figure 3, in combination with the corresponding lips, E, figure 2, substantially as and for the purpose shown and described.

Fourth, We claim the short wedge, D, figure 3, in combination with the stud, C1, and slot, H, in the manner and for the purpose substantially as shown and described.

53,492.—Bed Bottom.—Charles A. Scott, Aurora, Ill.:

I claim the herein described mode of securing the ends of the elastic straps in and to the said blocks and slats by means of the pins, a c, as and for the purposes described,

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53493.—Steam, Generator.—Henry C. Sergeant, New York City:

I claim, first, A tube with a partition in it, when so arranged that the fire will operate with the greatest intensity on one side of the tube, so as to cause a circulation of the water in opposite directions in the tube.

Second, I claim the combination and arrangement of the above described tubes with the inclined water leg and plate for holding the outer ends of tubes in position, substantially as shown and described.

53,494.—Soda-water Apparatus.—Charles C. Sheldrake and Joseph Bready, Philadelphia, Pa.:

We claim the cup or concave-shaped bottom, B, as constructed and applied in combination with the fountain, A, substantially in the manner and for the purpose as herein set forth.

The application of the cup or bottom plate, B, in its connection with the fountain by means of the screw threads, a, substantially in the manner and for the purpose as herein set forth.

53,495.—Slate Frame.—Francis Shenton, Statington, Pa.:

I claim a slate frame when constructed with a miter joint, tongue, and groove and secret dowel pin, substantially as described.

53,496.—Milling Tool.—John T. Smith, Middletown, Conn.:

I claim a cutter or milling tool made in two parts of irregular shape, substantially such as herein described, so that by interposing disks of paper or other suitable material the cutting face of the tool can be adjusted for slots or grooves of different width.

53,497.—Cooking Stove.—James Spear, Philadelphia, Pa Antedated Jan. 10, 1866 :

First, I claim the application of an inclined sleeve when applied within the limits of a stove or range, as shown and described.

Second, I claim the sleve, B, the doors, D, the hearth plate, A, the partition plate, G, and frame, L, arranged and combined substantially as described.

Third, I claim the bottom plate, I and L, when arranged in combination with the partition plate, G, and hearth plate, A, as shown and described.

Fourth, I claim the inclosed sifting pan, B, capable of being vibrated in combination with the ash pan, O, when both are applied to a stove or range, as shown and described.

53,498.—Condenser.—James F. Spence, Williamsburgh, N. Y.:

I claim the pipe or pipes, D, which connect with the exhaust pipe of a steamboat engine, in combination with the paddle wheel or wheels, B, substantially as and for the purpose described.

53,499.—Foot Press.—N. C. Stiles, West Meriden, Conn.:

First, I claim the segmental cams, G H, in combination with the working lever, F, punch, E, and foot lever, I, constructed and operating substantially as and for the purpose set forth.

Second, Providing the segmental cams with cogs on the sides of their working faces, substantially as and for the purpose described.

Third, The arrangement of clutches, K, or other equivalent devices, in combination with the cams, G H, lever, F, and punch, E, constructed and operating substantially as and for the purpose set forth.

53,500.—Milk Shelf.—D. B. Sturdevant, W. C. Parsons, and Freeland Wheeler, Clifton Springs, N. Y.:

We claim the combined construction and arrangement of the series of independently revolving skeleton shelves, D D, friction rollers, K K, and portable frame, A B, the whole admitting a free circulation of air and operating substantially as and for the purpose herein set forth.

53,501.—Priming Cartridge.—Thomas L. Sturtevant Boston, Mass.:

I claim a percussion cap plunger or discharger as made with a cap entrance stopper, b, and with a cap carrier, a, arranged and designed to operate therewith, as and for the purposes set forth.

I also claim the combination of the shoulder, n, arranged at the top of the stopper, with the said stopper, b, applied to the cap discharger, for the purpose set forth.

53,502.—Machine for Cleaning Grain, Etc.—E. Sweetland, South Bend, Ind.:

I claim the arrangement of the radial and inclined wings, D and I, case, A, in combination with the shaft, B', crank, C, and screw, D', in the manner and for the purpose set forth.

53,503.—Attachment for Cooking Stoves.—Joseph A. Talpey, Somerville, Mass.:

I claim the cooking stove attachment herein described, arranged in the place of the pipe elbow, as and for the purpose set forth.

53,504.—Apparatus for Carbureting Air.—Wm. Thompson, Cleveland, Ohio :

I claim the curved tapering chamber, b, pipes, c, and cylinder, D', in combination with the cylinder, C, pipe, S, chamber, p, and pipe, u, arranged in the manner and for the purpose described.

Second, The float, P', crank, J, rod, k, and lever, r, in combination with the rod, P, valve, l, and pipe, I, arranged in the manner and for the purpose set forth.

Third, The radiating perforated pipes, h', annular chamber, f, and opening, o, in combination with the pipe, I, and cylinder, A, arranged and for the purpose set forth.

Fourth, The arrangement of the perforated cylindrical chambers, E F, and spaces or straining chambers, z, in combination with the gears, a a', shaft, e, and cylinder, A, operating in the manner and for the purpose set forth.

Fifth, The purifying box, N, in combination with the cylinder, A, and its internal devices, and for the purpose set forth.

53,505.—Water Elevator.—John Tilley, West Troy, N. Y.:

I claim, first, The arrangement of the slide or slides, b b, guide or guides, d d, link or links, c c, combined door and spout or doors and spouts, B C a, and valved bucket or buckets, E E', all constructed and operating substantially in the manner and for the purpose described.

Second, The arrangement of the valved buckets, combined door and spout, and the slide, b, substantially as described.

Third, The construction of the windlass, G, of two sections, m n, in combination with a provision for keying the section to its shaft, substantially as described.

53,506.—Lamp.—Charles N. Tyler, Buffalo, N. Y.:

I claim, first, The wick, W X, as shown in figures 2 and 3, substantially as and for the purposes set forth.

Second, The divided wick, substantially as and for the purposes set forth.

Third, The wick supporter, c, substantially as and for the purposes set forth.

Fourth, The wick supporter, c, in combination with a wick tube larger than the wick, substantially as, and for the purpose set forth.

Fifth, The wick tube, C, as shown in fig. 4, substantially as and for the purpose set forth.

Sixth, The wick tube, G, as shown in figure 5, substantially as and for the purposes set forth.

Seventh, The grooved wick tube, as shown in figure 7, or its equivalent, substantially as and for the purposes set forth.

Eight, The wick tube used with the loose wick, when provided with opening, o, as in figure 9, substantially as and for the purposes set forth.

Fifth, The closed vapor chamber, G, in combination with the wick, W X, substantially as and for the purposes set forth.

Tenth, The cap, D, in combination with wick, W X, substantially as and for the purposes set forth.

Eleventh, The cap, D in combination with the small wick, substantially as and for the purpose set forth.

Twelfth, The cap, D, as shown in figure 6, substantially as and for the purposes set forth.

Thirteenth, The cap, D, with openings, o, as shown in figure 13, substantially as and for the purposes set forth.

Fourteenth, The valve chamber, V, provided with a valve, v, and opening, s, substantially as and for the purposes set forth.

53,507.—Iron Railway Sleeper.—Franz Vester, Newark, N. J.:

I claim the herein described iron railroad tie, constructed in the manner substantially as set forth, as a new article of manufacture.

53,508.—Crimping Boots.—O: J. Warren, New York City :

First, I claim the lining of the bar, o, with india-rubber, Q, when the same is made to serve the office of a holder, and is used in connection with a form, P, applied to the rubber through the medium of a yoke, N, or its equivalent, substantially as and for the purpose herein set forth.

Second, The nut, K, on the screen, k, of shaft, B, connected with the yoke, N, through the medium of the collar, N, for the purpose of allowing the yoke to be turned independently of the nut, for the purpose specified.

Third, The sleeve, F, on shaft, B, provided with a projection, j, in combination with the notched hub, G, collar, H, and spring, I, substantially as and for the purpose set forth.

Fourth, The coupling by which the shaft, B, is attached to the bench, the same being composed of a plate, C, secured to the bench by a screw, D, and provided with a socket, a, to receive a pintle, b, of a fork, C, which is secured to the sleeve, F, by pivots, e e, when said coupling thus constructed, is used in connection with the boot crimping apparatus attached to shaft, B, and for the purpose specified.

53,509.—Water Meter.—Charles Weed, Boston, Mass., assignor to himself and J. S. Shailer, of Roxbury, Mass.:

I claim the arrangement of the primary and auxiliary cylinders and valves by which the main piston driven by the pressure of the water operates the valve of the auxiliary cylinders, and brings it into position to cause the pressure of water to operate, alternately, the pistons of the auxiliary cylinders which, in turn, operate the valve of the main cylinder, substantially as described.

53,510.—Last.—William Wells, South Danvers, Mass.:

I claim the two-part last herein described, divided horizontally near its lower surface and otherwise adapted for use in the manner and for the purposes specified.

53,511.—Dish-washing Machine.—Jonathan Wheeler, Athol, Mass.:

First, I claim the combination in a dish-washing machine of an ordinary force pump, E G H, and flexible discharge pipes, M, with each other and with the box or tank, A, substantially as described and for the purpose set forth.

Second, The combination in a dish-washing machine of the box or tank, A, with one or more horizontal partitions or troughs, B C, so constructed and arranged that the same water may be forced upon the dishes any consecutive number of times, substantially as described and for the purpose set forth.

53,512.—Churn.—James White, Cleveland, Ohio :

I claim the tubes, h h, dasher, F, and case, A, in combination with the pendulum, C, gearing, D e, and levers, d, substantially as and for the purpose set forth

53,513.—Truss.—Lewis B. White, Moscow, N. Y. Antedated Sept. 27, 1865 :

I claim the two pivot bearings, o o, arranged at an angle to the end of the bow, in relation to the bow and pad lever, substantially as and for the purposes herein specified.

53,514.—Feeding Device for Sewing Machines.—John Williams, Troy, N. Y.:

First, I claim attaching to the feed-point or part of a serving machine which carries the feeding surface, an adjustable removable steel plate, or its equivalent, to receive the wear from the action of the part of the machine which raises it, substantially as above set forth

Second, I also claim attaching to the feed bar of a sewing machine an adjustable removable steel plate, or its equivalent, to receive the wear from the parts of a sewing machine which acts against it, substantially as described.

53,515.—Machine for Swaging Sheet Metal Spouts.—S. F. Woodworth, Iowa Falls, Iowa:

First, I claim the arrangement of said dies, B C, in a standard, A, so constructed as to fit the square holes usually formed in a tinsmith's work bench.

Second, The dies, B C, in connection with the lever, D, provided with the arm, f, and eccentric projection, e, substantially as set forth.

Third, The gages, b, in connection with the dies, B C, and lever, D, for the purpose specified.

Fourth, Having the upper surface of the die, B, in an inclined position to facilitate the adjustment of the blanks thereon, as set forth.

53,516.—Dairy House.—Silas D. Yerkes, Downington. Pa.:

I claim the frame, A, provided with suitable openings or holders for cans or pans containing milk or cream, or both, and constructed and arranged substantially as described for the purpose specified.

53,517.—Sealing Boxes, Etc.—Robert M. Bartlett (assignor to Sarah T. Bartlett), Cincinnati, Ohio :

First, I claim the mode or method of sealing boxes, substantially as set forth.

Second, A grooved and indented packing box, either of wood or other suitable material, substantially as and for the purpose set forth.

53,518.—Machine for Ironing Hats.—William Best and Mahlon S. Drake (assignor to William Best), Newark, N. J.:

First, We claim controlling the movements of the smoothing iron, in the manner described, by means of guides, s s, and latches, v v, arranged substantially as herein set forth.

Second, The pulley, f, with its crank wheel, r, the pitman, i, vibrating arm, u, and pawl, z, arranged with reference to each other and with the ratchet wheel, x, spur wheels, g and d, and table, A, substantially as herein set forth, for the purpose specified.

53,519—Bed Bottom.—Calvin M. Brown (assignor to David B. Turnbull), Aurora, Ill.:

First, I claim the combination of the wedge shaped block, D, the elastic strap, E, and the slats, G, arranged and operating substantially as and for the purposes specified.

Second, I claim securing the elastic strap, E, to the wedge-shaped block, D, by passing the strap through the mortise in said block, in the manner shown and described.

53,520.—Clasp for Pocket-books.—J. Warren Brown and Eliakim Rice (assignors to J. Warren Brown), New York City:

I claim the lid, and nicks, e, in combination with the swivel button, b, and slotted plate, c, constructed and operating, substantially as and for the purpose set forth.

53,521.—Churn.—James E Casey (assignor to himself and Richard Lambert), Courtland Village, N. Y.:

I claim a device for communicating a reciprocating rotary motion to a supplementary dasher of a churn, substantially in the manner and for the purpose set forth.

53,522.—Breech-loading Fire-arms.—Francis Clark, Auburn, Mass., assignor to himself and Thomas H. Dodge, Worcester, Mass.:

First, I claim making block D, in two parts, substantially as set forth.

Second, Making the circular part, D', open as at h, as and for the purpose set forth.

Third, The combination of the parts, E and F, substantially as set forth, whereby end, c, projects past the end of F, and prevents any joint in the block where it comes in contact with the rear of the cartridge.

53,523.—Water-proof Soles.—John W. Coburn (assignor to Oliver F. Case), New Haven, Conn.:

I claim coating the inside of the sole for boots and shoes with rubber or any of its allied gums, when prepared and united substantially in the manner and for the purpose herein set forth.

53,524.—Trammel for Ellipses.—Charles Crow (assignor to himself and James Hollingsworth), Onargo, Ill.:

I claim the making of five or more holes in the elliptical trammel sweep and graduating the same as above described, for the purpose of striking ellipses of different relative diameters, as set forth.

35,525.—Cultivator and Seeding Machine.—Charles Denton, Pekin Ill., assignor to himself, Samuel E. Barber, Samuel F. Hawley, Decatur, Ill.:

First, I claim the plow frame consisting of the two oblique bars, c c, connected together as shown and connected to the bars, D D, of the main frame by means of the joints, b, for the purpose of raising the plows out of the ground when desired.

Second, The pivoted draft pole, O, in combination with the pivoted plow standards, K K, arranged substantially as and for the purpose specified.

Third, The main frame consisting of the bar, C, with slide bars, D D, attached when used in combination with the plow frame composed of the oblique bars, c c, and all arranged substantially as described.

53,526.—Knob Latch.—Henry H. Elwell (assignor to the Norwalk Lock Company), Norwalk, Conn.:

First, I claim the connecting of the slide latch, D, with the arm, a', of the lever, B, by means of the recess, c, and rocket, d, of said arm and the curcular end, e, of the slide latch and the notches or the recesses, g g, in the top and bottom edges of the same, substantially as shown and described.

Second, In combination with the connection above specified, the pins, i, on the slide latch and the slide, E, substantially as and for purpose specified.

Third, The cylindrical collar, k, on the side latch in combination with the pins, i, and the slide, E, substantially as and for the purpose set forth.

53,527.—Thread Tension for Sewing Machines.—Pitt Evens, Jr., Cincinnati, Ohio, assignor to to the Florence Sewing Machine Company, Florence, Mass.:

I claim making and regulating tension in sewing machines by giving the thread a sigzag direction in its turns around the tension wheel, substantially as and for the purpose described.

53,528.—Condenser.—J. H. Fairchild, Highgate, Vermont, assignor to himself and Andrew Parker, Cleveland, Ohio:

First, I claim the basin, A, and perforated condensing pipe, F, in combination with the water pipe, H, and vapor pipe, E, as and for the purpose set forth.

Second, I claim the receiver, B, pipe, H, and pipe or spout, G, in combination with the pipe, F, and basin, A, as described.

Third, I claim the employment or a current of cold water, introduced through the pipe, C, so as to condense the vapor passing through the pipe, F, into oil in the receiver, B, as specified.

53,529.—Manufactue of Table Cutlery.—J. W. Gardner (assignor to the Lampson Goodnow Manufacturing Company), Shelburne Falls, Mass.:

I claim the combination of the pronged bolster and blade, forged in one piece, with a solid handle, all constructed in the manner herein represented and described.

53,530.—Knitting Machine.—Joseph Goodman (assignor to himself and Richard W. Reynolds), Pawtucket, R. I.:

First, I claim the combination of a set of stationary needles, n, having a triple motion, a rising and falling, an oscillating and a transversely-sliding motion, substantially as and for the purpose set forth.

Second, The transversely sliding carriage, K, in combination with the guide bar, t, adjustable rod, d', lever, f', and ratchet wheel, k, constructed and operating substantially as and for the purpose described.

Third, The carriage, K, and guide bar, t, in combination with the oscillating lever, l, and adjustable standard, q, substantially as and for the purpose set forth.

Fourth, The carriage, K, and guide bar, t, in combination with the slotted levers, v, and cams, a' a*, constructed and operating substantially as and for the purpose described.

Fifth, the double-flanged cams, o', worm wheel, n', and serrated wheel, k', in combination with the pawl, j', levers, f', and carriage, K, constructed and operating substantially as and for the purposes set forth.

Sixth, The rock shaft, i, with levers, l h, in combination with the standard, q, and carriage, K, and with the spring pawl, g, ratchet wheel, f, and feed rollers, F, constructed and operating substantially as and for the purpose described.

53,531.—Machine for Making Bolts.—Chas. Hall and Emil Hubner, New York City, assignors by mesne assignments of Chas. Hall and J. D. Van Voorhis:

First, We claim the combination of the preparing dies and finishing die with the tubular die and carriage, substantially as set forth.

Second, The combination of the subject matter of the first part of the invention with the carriage of the machine, and with the cam shaft of the dies, for forming both the preparatory and finished head in such manner that the carriage is moved intermittently, thus affording periods of rest during which the preparatory and finishing dies are operated substantially as set forth.

Third, The combination of the subject matter of the first part of the invention with the movable gage, substantially as set forth.

Fourth, The combination of the subject matter of the first part of the invention, and the carriage of the machine with a stop operated by a cam to hold the carriage at rest while the bolt blank is successively in the proper position to be acted upon by the several dies, substantially as set forth.

Fifth, The combination of the first part of my invention with the movable gage of the tubular die and with a cam by whose action the gage is caused to expel the bolt blank, substantially as described.

53,532.—Pump Valve.—A. M. Hansen (assignor to William Higby), Stockton, Cal.:

I claim a pump valve constructed in such a manner and so arranged relatively to its seat that the liquid shall be allowed to discharge both at the center and around the periphery of the valve, substantially as and for the purpose set forth.

Second, I claim the plate, C, formed with the channels, 7 8 9 10 11 and 12, adapted to communicate respectively with the chambers, 1 2 3 4 5 and 6, and so arranged that all may be closed or opened to the external air by the adjustment of the valve, K, or an equivalent closing device.

Third, In combination with the valve chamber, A, I claim the detachable plate, B, formed with the channels, B' B', as and for the purpose specified.

53,533.—Invalid' Bedstead.—Warren S. Hill (assignor to C. S. Baker, Manchester), N. H.:

I claim the combination of the rack, c, segment, D, cog-wheel, E, shaft, G, wheels, H, jointed arm, K, and feet, A', constructed and arranged relatively to each other, and operating in the manner and for the purpose herein specified.

53,534.—Cleansing Animal Charcoal.—Gustavus A. Jasper (assignor to The Union Sugar Refinery), Charlestown, Mass.:

I claim the new or improved process substantially as hereinbefore described, for treating charcoal, either after or before use in a filter for the cleansing of a saccharine or other liquid, the same consisting in boiling the charcoal in an acid solution and washing it, the while being essentially as specified.

53,535.—Tweer.—Robert D. Kincaid (assignor to himself and Hall & Speer), Pittsburgh, Pa.:

First, I claim in combination with a water box or reservoir, and a blast or air pipe passing through it, the sleeve jacket or pipe surrounding said air pipe and open to and communicating with the water in the water box for the triple purpose of surrounding said blast with water, and for allowing for a free circulation of the water, and to prevent any sediment from clogging or lodging therein, substantially as and for the purpose described.

Second, I also claim in combination with an air passing through the water box, horizontally, and capable of being attached or connected with a bellows, a vertical branch pipe rising up within the box for the purpose of being connected with a fan blower, both or either to be used, substantially as described.

53,536.—Drill-feed for Artesian Wells.—Thomas J. Lovegroove (assignor to himself and Henry Baldwin, Jr.), Philadelphia, Pa.:

First, I claim feeding the drill-rope from the bull-wheel over the end of the walking-beam through a series or system of pulleys, substantially in the manner described.

Second, I also claim the combination with the bull-wheel and the pulley, H, on top of the derrick of the pulleys, I J K, or their equivalent substantially as and for the purposes set forth.

53,537.—Spring Punch.—John Lyle (assignor to himself and C. H. Allen), Newark, N. J.:

I claim the combination of the double spring, D, with the arms, A and B, of the punch, and with the thumb catch, E, substantially as described and for the purpose set forth.

Second, The combination of the thumb catch, E, with the spring, D, the arm, A, and the revolving cylinder, F, substantially as described and for the purpose set forth.

Third, The combination of the revolving cylinder, F, with the arm, A, and the thumb catch, substantially as described, and for the purpose set forth.

Fourth, The construction of the arm, a, and its combination with the arm, B, substantially as described, and for the purpose set forth.

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53,538.—Machine for Preparing Peat for Fuel.—Samuel Marden (assignor to himself and Wm, H. Allen, A. P. Trott, and Cyrus Cobb Jr.), Newton, Mass.:

First, I claim the combination of the triturating mechanism, the follower, and the molds, when arranged to operate substantially as described.

Second, I claim also the employment of the cleavers, in combination with the follower and double set of mold boxes, substantially as shown and described,

Third, Also the arrangement or combination of mechanism for actuating the follower and clearers, substantially as shown.

Fourth, Also the mechanism for imparting the reciprocating lateral movements to the mold box, substantially as set forth.

53,539.—Revolving Fire-arm.—William Mason (assignor to E. Remington & Sons), Ilion, N. Y.:

First, I claim in combination with a revolving cylinder fire-arm a pivoted and hooked cartridge case extractor, arranged to operate in connection therewith, substantially in the manner herein described,

Second, I also claim in combination with a hook upon the extractor, the beveling of the rear end of the cylinder so as to insure the entrance of the hook between the flange of the cartridge and the cylinder, substantially as described.

Third, I also claim the recess, f, in the face of the extractor for allowing the cartridge case to turn or move while it is drawn out in a curved line from a straight chamber, substantially as described.

53,540.—Frame for Securing Liquor and Other Bottles.—Frederick J. Miller (assignor to William J. Miller), Brooklyn, N. Y.:

I claim a frame for holding and locking up bottles by means of a movable locking device, substantially as specified, applied to retain the bottles and stoppers, as set forth

53,541.—Clothes Drier.—Samuel Parker (assignor to Elton Ward), Forest Grove, N. Y.:

First, I claim a clothes frame sliding on guide ways, for the purpose of receiving the clothes within a room, and carrying them out into the open air when arranged, and to expand and contract as herein described.

Second, I further claim the levers, I I P P, with the hanging cords for contracting the apparatus, to pass through a door or window, and expanding it for use, as explained.

53,542.—Piston Rod Packing.—Edward T. Prindle (assignor to Self and James Walker), Aurora, Ill.:

I claim, First, The combination of the perforated cap, e, for the admission of steam or other elastic agent, with the conical packing, d, substantially as and for the purpose set forth.

Second, The combination of the perforated cap, e, springs, c, bearing ring, i, and the sectional conical packing, a, substantially as described.

53,543.—Breech Loading Fire-arms.—Joseph Rider, Newark, Ohio, assignor to Self and E. Remington & Sons, Ilion, N. Y.:

I claim in combination with an under hung hammer, such as described, a combined half and full cock, trigger, d e, pivoted to the frame and to each other, and acting in connection with the tail, b, so that the hammer may be securely held at half cock, and operate in the usual well-known manner at full cock, thus making the arm perfectly safe to carry when loaded, substantially as described.

53,544.—Car Brake.—Daniel T. Robinson, Boston, Mass., assignor to Self and Lorin L. Fuller, Malden, Mass. Antedated March 21, 1866:

I claim the application and arrangement of the lever, D, or its equivalent device, substantially in manner and to operate as above described, and in combination with said lever, I claim the employment of the auxiliary rope or chain, b' essentially in manner and to operate as hereinbefore set forth.

53,545.—Soldering Iron.—John H. Trowbridge, (assignor to Self and Daniel Fuller), New Haven, Conn.:

I claim a soldering iron constructed in the manner substantially as herein described, as a new article of manufacture.

53,546.—Metallic Handle for Cutlery.—Leroy S. White (assignor to Self, Rogers & Brother, and Green Hendrick), Waterbury, Conn.:

First, The method of effecting the soldering of the tang of table and other cutlery, in tubular metallic handles by inserting the solder at or through the rear open end of the latter, substantially as described.

Second, Constructing and applying the cap, D, as described.

53,547.—Apparatus for Preparing Peat.—Henry Youle Hind, Fredericton, N. B:

First, I claim the method herein described of drying peat, and preparing it for immediate use as fuel, by exhausting the moisture and compressing the peat substantially as and for the purpose set forth.

Second, I claim the conical or funnel-shaped perforated bottom, B, with the interposed layer or filling of canvas, or its equivalent, as and for the purpose described.

Third, I claim the combination of the cylinder, A, perforated bottom, B, and chamber, C, as and for the purpose set forth.

Fourth, I claim the combination of the cylinder, A, perforated bottom, B, chamber, C, and the air-exhausting apparatus, as and for the purpose set forth.

Fifth, I also claim the combination of the cylinder, A, provided with the false bottom, B, and air space, C, with the heating apparatus, S, and its connecting pipe, T, substantially as and for the purpose described.

53,548.—Revolving Fire-arm.—Prosper Polain, Brussels, Belgium:

First, I claim the combination of the following elements: I claim a revolving cylinder, whose chambers are provided with lateral openings and countersunk grooves, as set forth.

Second, A cluster of charge tubes capable of revolution with the revolving cylinder, and of sliding on its axis, as herein described, the whole operating so that the fire-arm may be loaded or the charges withdrawn without disengaging the sliding charge tubes from their respective cylinder chambers.

53,549.—Substitute for Leather.—Philipp Wenzel, Mayence, in the Grand Duchy of Hesse Darmstadt (assignor to Simpson K. Urbino), Boston Mass.:

I claim the composition made substantially as described.

53,550.—Apparatus for Disengaging Boats from Davits.—Edward Oliver & George Myers, Rotherham, England. Patented in England September 9, 1863:

First, We claim the tube, A, inclosing the rod, B, formed with right-handed and left-handed screws, a and b, with their screwed, threaded nut, recessed to receive the pointed ends of the hooks, E E, and handle or hand-wheel, C, the braces, D, with their weighted hooks, E E, and the locking catch, m, the whole being arranged substantially in the manner and for the purposes hereinbefore described and set forth.

Second, The double-barreled windlass, with its weighted lever brake, K, substantially in the manner and for the purposes hereinbefore described and set forth.

Third, The two rods, a a, with their curved inner ends, b b, and furnished with a rack, the teeth of the said rack gearing into the pinion, c, which is caused to rotate from the outside by the weighted lever or hand wheel, d, the whole bing operated substantially in the manner and for the purpose hereinbefore described and set forth.

And, Lastly, Forming the lower ends of the brace pieces, D D, with the jaw pieces, e, e, for inserting the ring or hooks by which the boat is suspended, And passing the rods, a a, through the hooks or the eye of the rings by which the boat is suspended, the same being operated substantially in the manner and for the purpose hereinbefore set forth.

53,551.—Dropper for Harvesters.—Jacob Miller, Canton, Ohio:

I claim a flexible dropper for catching, holding and delivering grain as it comes from the cutters, constructed and operating in the manner and for the purpose substantially as described.

REISSUES.

2,209.—Lamp Trimmers and Shears.—William B. Barnard, Waterbury, Conn. Patented December 27 1864:

I claim the construction of shears or lamp-trimmers substantially in the manner herein set forth.

2,210.—Sewing Machine.—Joseph W. Bartlett, New York City. Patented January 31, 1865:

First, I claim imparting to the looper rod the rocking and sliding motions described, when the parts for giving these motions are arranged and operated substantially as and for the purposes described

Second, The adjustable sleeve, o, constructed and operated substantially as and for the purposes set forth.

Third, In combination the rocking and sliding rod, e, sleeve, o, cam, u, and feed bar, s, constructed and operating substantially as described.

Fourth, The combination and arrangement of the rotating cam, g, on the driving shaft, with the connecting rod, h, rocking shaft, i, cam, u, and feed bar, s, operating as and for the purposes set forth.

Fifth, The presser foot, e, cam, x, shown in figure 7, and sliding and rocking rod, f, when combined and operating substantially as described.

2,211.—Revolving Fire-arm.—John Webster Cochran, New York City. Patented November 10, 1863:

First, I claim the unloading and cartridge shell expelling piston or plunger, d', attached to the frame of the fire-arm so as to work through the recoil shield, substantially as and for the purpose herein specified.

Second, The unloading piston or plunger, d', and loading rammer, d, connected by a bar or yoke, e, to operate substantially as and for the purpose herein specified,

2,212.—Insulating Telegraph Wires.—Alfred B. Ely, Newton, Mass. Patented January 9, 1866:

First, I claim insulating telegraph wires and conductors, or their supports, with the material described substantially as set forth.

Second, The new article of manufacture described, constituting an insulated wire, made substantially as set forth.

2,213.—Machine for Oiling Wool.—George S. Harwood and George H. Quincy, Boston, Mass. Patented October 7, 1862. Reissued September 13, 1864:

First, We claim the oiling or lubricating of wool or other fibrous material, by means of a pressure roller imprinting and diffusing the oil or lubricating mixture which shall have been supplied in requisite quantity to the roller in the manner substantially as set forth.

Second, A machine or apparatus for oiling wool, consisting of the following elements combined:

1st, One or more reservoirs for containing the oil or oleaginous mixture. 2d, A dipper or dippers and a brush or brushes, the former to convey and the latter to receive the determinate and requisite quantity of oil or oleaginous mixture. 3d, A distributor or distributors, receiving oil or oleaginous mixture from the brush or brushes and transferring it to the wool, substantially as set forth.

Third, In automatic wool-oiling machinery, we claim the combination of a tank or reservoir with a dipper or equivalent mechanism for performing the double function of stirring or agitating the oil or lubricating matter in the tank, and of lifting therefrom at each action a quantity of oil or lubricating matter requisite for one oiling operation, and this is claimed only when arranged for operation as described—that is to say, so that the said dipper shall come in contact with the wool, substantially as set forth.

Fourth, In automatic wool-oiling machinery we further claim, combining with an oil tank, a dipper, constructed substantially as described, for the more perfect agitation of the liquid, substantially as set forth.

Fifth, In automatic wool-oiling machinery we also claim the combination of an oil tank, with a dipper constructed substantially as described, so that the requisite quantity of oil for each operation shall be lifted and conveyed from the tank by adhesion of the oil or lubricating matter to the dipper, substantially as set forth.

Sixth, The combination with an oil reservoir and intermediate dipper and brush, or other equivalent device for conveying oil in requisite quantities to the distributor of a pressure roller arranged immediately in front of the feed roller above the feed apron of carding or other wool-preparing machinery, substantially as set forth.

Seventh, In a wool-oiling apparatus, in which the wool is oiled by imprinting the oil as described, we claim, in combination with a pressure roller or the equivalent thereof, a brush or brushes charged with oil by means of one or more dipping plates, substantially as set forth.

Eighth, The combination with one or more oil reservoirs and traveling brush or brushes of a plate or plates for changing the said brush or brushes with the requisite amount of oil, and when arranged for action so as to properly agitate the oil or oleaginous mixture, substantially as set forth.

Ninth, In combination with a distributing pressure roller, we claim a brush traveling diagonally over the said roller—that is to say, at an angle with the axis of, but in a plane tangent to, the roller, substantially as and for the purposes set forth.

2,214.—Improved Blasting Compound.—Louis Ludovice and Louis Ludovice, Jr., New York, City, assignees of Moriz Nowark, of Williamsburgh, N. Y. Patented May 24, 1864. Antedated March 18, 1863:

First, I claim the combination of chlorate of potash, nitrate of potash, and ferrocyanate of potash with each other, and with a substance capable of evolving gases, such as carbon or equivalent materials, substantially as and for the purpose described,

Second, The combination of chlorate of potash, nitrate of potash and ferrocyanate of potash with binoxide of manganese, substantially as and for the purpose set forth.

Third, The use of bicromate of potash, in combination with chlorate of potash and nitrate of potash and ferrocyanate of potash, substantially as and for the purpose described.

Fourth. The application of a solution of chlorate of potash, nitrate of potash and ferrocyanate of potash to paper or other vegetable materials capable of being formed into cartridges and protected by some water-tight compound, such, for instance, as those above specified, for the purpose set forth.

2,215.—Improved Cement for Slate Roofing.—Charles Wanzer, of New York City. Patented June 24, 1862:

I claim a compound to be used as a cement, composed of grease, pitch or tar, and quick lime, hydrate of lime, chloride of lime or bleaching powder, or any equivalent thereof, either with or without linseed or other oil, and venetian red or other ochre, substantially as described.

2,216.—Improved Method of Starting Street Railway Cars.—Thomas R. Sinclaire, of New York City. Patented December 19, 1865:

First, I claim, in the application of car starters and brakes to railroad cars, the suspending of the frame, C, in which a portion of the operating machenism is placed directly on the axles, D D, of the car, the axles passing loosely through said frame, substantially as shown and described.

Second, The arrangement, a spring or a series of springs, working conjointly or in unison, and constituting the motor of a car starter and brake, with the operating mechanism in such a manner that the motor may be applied to either axle of a car, and the spring or springs wound up from either axle, substantially as shown and described.

Third, The sliding clutch, F, in connection with the gears, E I, when arranged with a spring or springs, J, substantially as and for the purpose herein set forth.

Fourth, The levers, G G, connected with the clutch, F, and applies to the truck substantially as described, when used in connection with the gearing and spring or springs, as and for the purpose set forth.

DESIGNS.

2,284.—Coffin Handle.—P. Bradford (assignor to Sargent & Company), New Haven Conn.

2,285—Floor Oil Cloth.—Charles T. Meyer Bergen, N. J.

2,286.—Tobacco Pipe.—Louis Laarback, Philadelphia, Pa.

2,287.—Plate of a Cook Stove.—Garretson Smith & Henry Brown, (assignors to Abbot & Noble), Philadelphia, Pa.

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5. It is so simple in its construction that any person can adjust it and direct its operations without previous experience.
6. It is not liable to get out of repair.
7. It uses clay directly from the bank, water being used if the clay be not sufficiently moist.
8. The Machine tempers its own clay, presses it into molds, strikes the brick, lifts them from the molds, and turns them on edge ready for removal.
9. The clay is used so stiff, and under pressure so great, that the brick can be hacked ten high directly from the Machine, all risk of destruction by rain being entirely obviated.
10. All the labor required in making brick by this Machine is to shovel in the clay, and to remove the brick for hacking as they issue from the molds.
11. It requires one man to shovel the clay, one boy to remove the brick to the truck, one boy to run off the truck, and one man to hack the brick.
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"The clay is taken directly from the bank, a little water being used, if necessary. It is then shovelled into the machine which thoroughly tempers it, presses it into the molds, strikes the brick, and turns them on edge ready to pick off, all by simple machinery, without any handling or sanding the molds.

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GARD'S BRICK MACHINE.

Improved Brick Machine.

These engravings represent a new brick machine which has some points of novelty. It is of that class where bricks are molded direct from the pug mill or chamber where the clay is tempered, without passing through other processes. It is extremely compact in form, and has but few details and those not of a complicated character.

Fig. 1 is a perspective view; Fig. 2 is a section through the machine, and Fig. 3 is a view of the aperture through which the clay passes into the mold.

The clay is placed in the chamber, A, and the mill set in motion by the action of a sweep in the head, B. This pulverizes and intimately mixes the clay by the beaters, C, on the main shaft. These have a twist in them which causes the clay to be forced down to the bottom of the chamber. Here there is a spiral blade, D, whose office is to force the clay into the mold boxes, which are shown at E. These are ranged in rows about the circumference of a circular table, F, which revolves through the action of gearing, in a direction contrary to the blade, D, so that as the clay enters the mold the blade moves against it and crowds it down compactly in the corners. As the table, F, continues its motion, the brick is carried with it, and the superfluous clay cut off by a slide, G, Fig. 3. This is retained in place by two stout wooden plugs, H which are strong enough for ordinary purposes; should any stone accidentally get in the clay and come in contact with the slide and the edge of the mold, the plugs will break and thus allow it to yield, thereby saving more important parts of the machinery from injury. The bricks are now formed and in the boxes; it remains to get them out. This is done in a novel manner. The reader will see two inclined planes—one at I, in Fig. 2, and another at J, Fig. 2. The former raises the box by the aid of a roller, K, and the latter throws the brick out. This is done by having a false top, L, exactly like a box cover with hinges. There is a short shaft, M, Fig. 2, which projects through the mold box and rests at bottom on the inclined plane, J, as clearly shown in Figs. 1 and 2. As the table runs round them, these planes push up the box, and one acting a little after the other, tip the brick out on the table, from whence it is afterward removed. These are the details, and in the model they work well.

Patents were issued Nov. 25 and Dec. 5, 1865. A patent is also pending on the machine through the Scientific American Patent Agency. For further information address E. R. Gard, No. 102 Lake street, Chicago, Ill. [See advertisement on another page.]

Fig. 1.

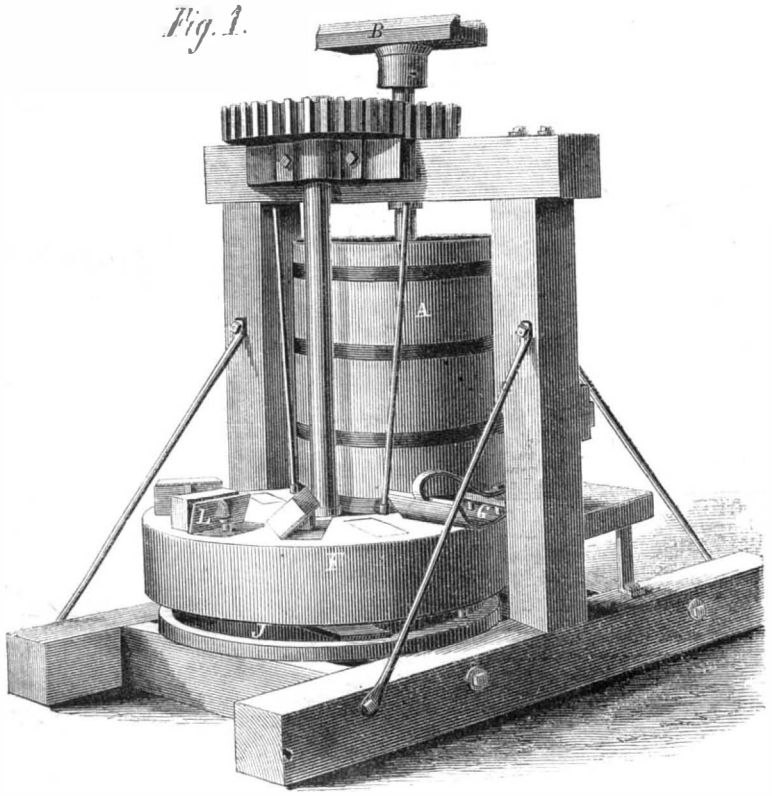


Fig. 2

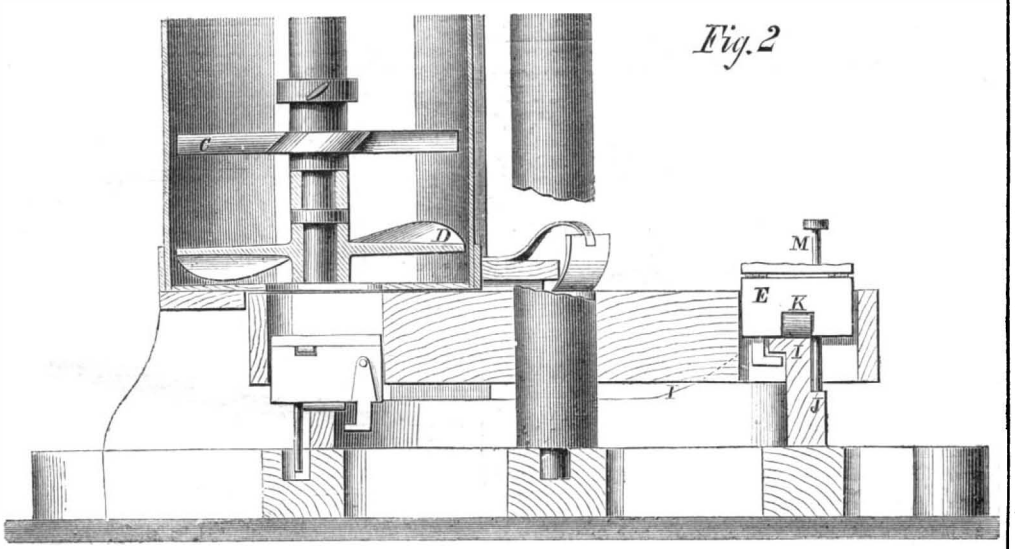
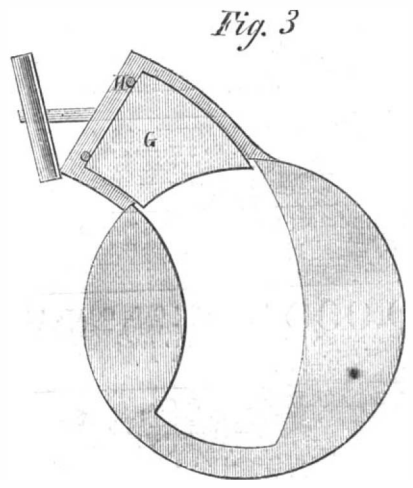


Fig. 3



Electricity in a Cotton Mill.

The Lowell (Mass.) *Courier* of March 23, says:—

"It is a general truth that friction developes electricity, and most workmen know that a macine belt at high speed by its friction with the air is highly electrified. It has for years been a common experiment for a workman to light gas burners by holding one hand to a fast-going belt and the other to the open burner. This matter was curiously demonstrated in the Appleton Mills of this city on Wednesday. A strong smell of fire being noticed, the premises were carefully searched, and a small quantity of cotton lint inside a belt casing, was found on fire. The lint lay upon a beam which was within four inches of a belt some fifteen inches wide and moving two hundred and twenty revolutions a minute. In the beam was an iron bolt, the head of which was toward the belt. From the belt to the bolt was passing a stream of electric sparks, which had set the cotton lint on fire. After attending to this case Mr. Motley, the agent, opened the casing of a similar belt in another mill. The beam in this case was fourteen inches from the belt, but the stream of electric sparks was at once seen jumping across the beam although it had not set fire to anything. Perhaps some of the cases of fire from supposed 'spontaneous combustion' are due to electricity from machinery. The subject is an interesting one for investigation, and probably a profitable one."

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